THE ROLE OF THE INTERNATIONAL PATENT SYSTEM IN THE TRANSFER OF TECHNOLOGY TO WEST AFRICA: CASE STUDIES - GHANA AND NIGERIA

by

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TABLE OF CONTENTS

(vi) No-Challenge or No-Contest Clause

(vii) Minimum Royalty Payments

Technology Transfer and Third World Development

The Transfer of Technology

Technology Transfer and Indigenous Technological Capability

Conditions for the Protection of I.T.C.

I.T.C. and The Patent System

I.T.C. and the Technological Gap

Conclusion

58-97

CHAPTER TWO

THE INTERNATIONAL PATENT SYSTEM AND THE DEVELOPMENT AND TRANSFER OF TECHNOLOGY

Historical Development

A. Main Features and Provisions of the Paris Convention

(i) National Treatment (Article 2)

(ii) Right of Priority (Article 4)

(iii) Independence of Patents (Article 4 Bis)

(iv) Compulsory Licensing (Article 5)

B. The Diplomatic Conference on the Revision of the Paris Convention.

C. UNCTAD

(i) Patents

(ii) Transfer of Technology: UNCTAD's Code of Conduct on the Transfer of Technology.

D. National Policies

(i) Patents

(ii) Transfer of Technology

CHAPTER THREE

THE HISTORICAL DEVELOPMENT OF THE PATENT SYSTEM IN GHANA AND NIGERIA

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It must, however, be pointed out that much of this work is the result of the author's efforts and he solely bears responsibility for any shortcomings or errors.

ABBREVIATIONS

ARCT	African Regional Centre for Technology
BIRPI	United International Bureaux for the Protection of Intellectual Property
CPC	Community Patent Convention
CSIR	Council for Scientific and Industrial Research
DCs	Developed Countries
ECOWAS	Economic Community of West African States
EEC	European Economic Community
EPC	European Patent Convention
ESARIPO	Industrial Property Organisation for English-Speaking Africa
FDI	Foreign Direct Investment
FMEST	Federal Ministry of Education, Science and Technology
FMF	Federal Ministry of Finance
GIC	Ghana Investments Centre
GIHOC	Ghana Industrial Holding Corporation
ITC	Indigenous Technological Capability
ITF	Industrial Training Fund
LDCs	Less Developed Countries
MFEP	Ministry of Finance and Economic Planning
MIST	Ministry of Industries Science and Technology
MNCs	Multinational Corporations
NIEO	New International Economic Order
NOIP	National Office of Industrial Property
OAMP	Office Africaine et Malgache de la Propriete Industrielle
PAB	Public Agreement Board
PCT	Patent Co-operation Treaty
R & D	Research and Development

RGD	Registrar-General's Department
TTB	Technology Transfer Board
TTC	Technology Transfer Centre
UNCTAD	United Nations Conference on Trade and Development
UNCTC	United Nations Centre on Transnational Corporations
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
UNESCO	United Nations
UNIDO	United Nations Industrial Development Organisation
UNITAR	United Nations Industrial Training and Research
WIPO	World Intellectual Property Organisation

LIST OF CASES

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2. Brulotte v Thys Co., 379 US29 (1964).
3. Dehydrating Process Co. v A.O. Smith Corpn., 292 F.2d (1st Cir. 1961).
4. Hazeltine Research, Inc., v Zenith Radio Corp., 395 US. 100.
5. Horville Engineering Co. Ltd. v Clares Engineering Ltd. [1976], RPC 411 C.A.
6. Lear v Adkins, 395 US 653; 23 L. Ed. 610.
7. Pfizer Corporation v Ministry of Health, L. R. [1965], AC (H.L.)
8. Polaroid Corporation (Land's) Patent [1981] RPC 111 C.A.
9. Raymond v Nagoya Rubber Co. [1972], CMLR D45.
10. Re Agreement of the Davidson Rubber Co. [1972], CMLR D52.
11. Rhone Poulence S.A. and May & Baker v Lodeka Pharmacy Ltd. [1965] LLR9.
12. Rhone Poulence S.A. and May & Baker v Ghana National Trading Corporation [1972] GLR, 109.
13. U.S. v Lowe's Inc. 371 US 38 (1962); 9 L.Ed. 2d.11.

LIST OF TABLES

DEDICATION

This work is dedicated to my mum, Isabella,

and to the memory of my late dad Paul Kojo Yankey

and my granny Josephine Tennachie.

ABSTRACT

The principal aim of this thesis is to undertake a critical examination of the role of the international patent system in the transfer of technology to West Africa, particularly Ghana and Nigeria. It focuses mainly on the patent systems and technology regulatory regimes of the two countries. The study is intended to identify and evaluate the impact of the international patent system on the transfer and development of technology in this area.

The first chapter provides a theoretical foundation to some of the more practical issues to be discussed in the subsequent chapters. The Paris Convention and the diplomatic revision exercise thereof, as well as other efforts and policies regarding patents and technology transfer at various levels are discussed in Chapter Two. Chapters Three to Eight consider the two case-studies undertaken in this thesis. Chapter Three begins with the historical development of the patent system in both Ghana and Nigeria, and the remaining chapters continue with a discussion of the present patent and technology regulatory regimes of both countries. Based on facts and figures the two case-studies examine critically the patent law and systems and technology transfer laws of these two countries including other related institutional measures highlighting their strengths and weaknesses.

The study argues that if the patent systems of both countries are to play a meaningful role in the transfer and development of technology they must be utilized as a tool of economic policy and also be related to the technology transfer regimes which must necessarily be integrated into the national technology policy which should, in turn, be made an integral part of the entire national development plan. It is concluded that it is only in this way that the patent system can effectively contribute to the transfer of technology and the development of indigenous technological capabilities in the two countries.

GENERAL INTRODUCTION

The facilitation of the transfer of technology from the developed to the less developed countries (LDCs) is one of the fundamental issues that subtends the demands of the LDCs for the establishment of a new international economic order. The LDCs have deprecated the present framework within which international trade and investment transactions including the transfer of technology take place, and have advocated a restructuring of the framework to ensure fair and equitable transactions between the two sets of parties. A pivotal ingredient of the developed countries' (DCs) hegemony over the world economic system is their control of technology and, thus, of industry. This is likely to be so for a considerable period of time until the research and development (R & D) capabilities of the LDCs improves sufficiently to generate the technology required for industry in the latter. While some LDCs are improving upon their technological infrastructures as a long term solution, others have been concentrating on measures that will improve their access to as much foreign technology as possible.

In fact, most LDCs, in their naive assumption that the transfer of technology or access to technology is a panacea for their problems of under-development, have undertaken almost every conceivable measure to gain access to foreign technology. The assumption is naive in that it ignores the need for the initial profound structural changes within the LDCs without which the prospects of choosing technology capable of remedying the under-development of any country are limited. In addition, the assumption is quite often divorced from the preliminary determination of what kinds of goods and services to be produced in order to satisfy the needs of their societies, who is to produce them,

and how their production and distribution are to be organised. It is only when all these issues are duly considered and acted upon that there could be a meaningful eclectic approach by the LDCs in their choice of technology from the many existing and adaptable technologies which are most appropriate to the goals of the social system in its battle against under-development.

The measures undertaken by the LDCs to encourage the transfer of technology include favourable investment incentives to multinational enterprises, joint-ventures projects between either host governments or individuals and foreign investors, and the engagement of foreign personnel under know-how and management contracts. Another measure is the adoption of a patent system as well as the accession to the international (Paris) convention for the protection of industrial property. It is this measure which will be the main focus of this study.

A number of LDCs, including Ghana, Nigeria and other West African countries, have adopted a patent system of one sort or another, and, in addition, acceded to the Paris Convention which is an essential component of the international patent system. The latter also includes national patent laws and systems as well as practices connected with international trade and investment. Ghana and Nigeria have patent legislation which governs their patent administrations. The main patent legislation of Ghana upon which its patent system is founded is the colonial Patents Registration Ordinance of 1925 as amended by NRCD 81 of 1972. On the other hand, Nigeria in 1970, promulgated its own independent patent legislation, the Patents and Designs Decree of 1970, which governs the administration of patents in that country.

The main objective of this study is to investigate the contribution, if any, of the international patent system to the effective transfer and development of technology in Ghana and Nigeria. In addition, the study assesses how the patent systems together with the technology transfer regulatory regimes of both countries could, inter alia, be utilized as measures for economic development. Accordingly, in this study I intend to examine critically, in addition to the Paris Convention, the patent laws and systems as well as the technology transfer laws of the two countries with a view to highlighting some of their strengths and weaknesses. The examination will also cover other related measures and institutions. Moreover, I will endeavour to offer some suggestions directed at improving the patent and technology transfer regimes of both countries. All this will be pursued within the broader context of the international political economy.

Chapter One examines the concept of technology and the legal nature of a patent. It also covers recent trends in patenting activities as well as the economic functions of the patent system which include the disclosure and spread of technical knowledge, R & D, innovation and the transfer of technology. Furthermore, it examines some of the common restrictive covenants in patent and technology licensing. These include export prohibitions, grant-back or improvement clauses, tie-ins, price fixing, field of use restriction, no-challenge clause and minimum royalty payments. The second section of this chapter deals with the technology transfer process and the thorny issue of third world development. It seeks to uncover the rationale for the entire process of technology transfer from the DCs to the LDCs and relates it intimately to the problem of under-

development. The contribution of the transfer of technology to the development of LDCs' indigenous technological capabilities (ITC) and the possible use of the patent system in this respect as well as closer technological co-operation between third world countries are also covered by this section.

Chapter Two commences with the historical development of the Paris Convention and provides a critical analysis of some of its major provisions which include those relating to the concept of national treatment (article 2), right of priority (article 4), the independence of patents (article 4 bis), compulsory licensing (article 5) and imports (articles 5A1 and 5 quater). This is followed immediately by a discussion of the current diplomatic conferences on the revision of the Paris Convention which seems to have reached a stalemate. The chapter is concluded with a discussion of policies and efforts at the international, national and regional levels which are aimed at improving both the patent system and technology transfer regimes.

In Chapter Three I discuss the historical development of the patent systems of both Ghana and Nigeria which will be traced to the discovery of the gold deposits in the Tarkwa district of the then Gold Coast (now Ghana). I also examine critically the first colonial patent ordinance for the then Gold Coast which was used as a model for the former Lagos Colony, the Southern and Northern protectorates which together now constitute the Federal Republic of Nigeria. Subsequent colonial patent ordinances such as the 1916 U.K. Patent Registration Ordinance for Nigeria and the 1925 Patents Registration Ordinances for both Ghana and Nigeria will also be discussed. The discussion under this chapter will cover the first patent infringement suit in Nigeria which culminated in the promulgation of the Patent Rights (Limitation) Decree, 1968.

Chapters Four and Five represent the main body of the first of the two case-studies. In Chapter Four, I examine the principal patent legislation of Ghana which is the 1925 patent Ordinance and NRCD 81. The examination here will seek to bring out some of the strengths and weaknesses of these enactments and the possible impact on the patent system established by them, and in particular, on domestic inventive activity as well as the transfer of technology to the country. Also under discussion here will be the investment codes of 1981 and 1985, particularly the provisions regarding the transfer of technology and how they relate to the patent system.

Chapter Five discusses the Ghanaian patent system, and, with empirical evidence, its practical effects on the transfer of technology to Ghana as well as the stimulation of domestic R & D and, in general, on patenting activity in the country. Related policy considerations will also be discussed. The second section of the chapter examines the possible impact of the technology transfer regulations as provided in the country's investment codes vis-a-vis the anticompetitive practices which still take place in licensing transactions involving Ghanaian firms. In this respect the effectiveness of and the practical problems facing the Ghana Investments Centre (GIC), the body set up to regulate technology transfer transactions will also be evaluated. Similarly, related policy considerations will also be discussed.

Chapters Six and Seven represent the main body of the second case-study covered by the thesis. Like Chapter Four, Chapter Six will undertake an examination of the main patent legislation of Nigeria which is the Patents and Designs Decree, 1970, and will highlight some of its strengths and weaknesses as well as its possible impact on indigenous inventive activity, I.T.C. and technology transfer to

Nigeria. The National Office for Industrial Property (NOIP) Decree, 1979, which is the main enactment for the regulation of the transfer of technology agreements will be examined in the second section of the Chapter.

Chapter Seven examines, with empirical evidence, the practical effects of the Nigerian patent law and system on patenting activity in the country and the transfer of technology to that country. Similarly, on the basis of available figures and information, the practical impact of the NOIP Decree in the regulation of technology transactions will be assessed. In addition, the success of and problems facing the NOIP, the main body set up by Decree to control technology transfer transactions will be examined. Finally, related policy considerations will also be discussed in this chapter.

The major differences and similarities between the patent systems and technology transfer regulatory regimes of Ghana and Nigeria will be discussed in Chapter Eight. This chapter will end with recommendations which will be based on the findings of the study.

The final chapter which is the conclusion provides a brief summary of most of the theoretical and practical issues and highlights some of the major issues raised in the study. It will also contain a resume of some of the suggestions and recommendations which will be offered by the study.

SOURCES OF INFORMATION

The fieldwork required for this study took the author to five countries namely Ghana, Nigeria, the Ivory Coast, Senegal and Switzerland where the author had a series of interviews and

discussions with officials from various relevant institutions. These interviews and discussions were, in most cases, backed by documentary evidence. The study is largely based on the findings of the fieldwork research carried out in the above mentioned countries, on documents and legal instruments and statutes, court cases, relevant government policies and programmes, secondary sources such as books, journals and reports, and the author's personal knowledge of West Africa.

CHAPTER ONE

TECHNOLOGY, LAW AND DEVELOPMENT

Introduction

In this chapter we shall endeavour to examine and clarify the concept of technology. This will necessarily help us, in view of the diverse meanings ascribed to the concept, to be clear about the sort of technology the study is concerned with. The chapter will also examine the legal form of technology, particularly patent, the economic functions of patents, and the technology transfer process and third world development.

The Concept of Technology

The concept of technology is subject to a varied number of definitions. However, the varying approaches to the definition of this concept can be categorised into two major types. These are what I refer to as the Technicist and Humanist approaches to the understanding of technology. The Technicist definition of technology explains it soley in terms of its technical aspects, while the Humanist definition relates it to societal needs.

Among the Technicist definitions of technology is that offered by Gibson when he stated that "it is considered to be scientific, engineering, and managerial knowledge which makes possible the conception, design, development, production and distribution of goods and services". (1976, 24). This definition seems to be narrow, and might not include agricultural, military, medical and other

technologies. As a matter of fact, it is a good description only of industrial technology, and, thus, a specific example of man's knowledge which is necessary for the satisfaction of some of his wants.

Similarly, Hayden defines technology as "the quantum of knowledge by which such inputs as patent rights, scientific principle and R & D (research and development) are translated into production of marketable industrial materials, components and end products" (1976, 23). This quantum of knowledge, he adds, "comprises two parts: the engineering documentation and the manufacturing techniques. The latter are the human implementation of the written instructions contained in the former" (Ibid). This definition, though it clearly explains an industrial or a manufacturing technology, is equally narrow and suffers from the same defects as Gibson's.

Another technicist definition which appears to be a departure from the above two is that provided by Gruber and Marquis (1969). They define technology as "the means or capacity to perform a particular activity" (p.255). It is derivable from this definition that technology involves "process" in the sense that it is man's capability to transform physical objects. This definition, on the other hand, seems so broad as to encompass almost every sphere of human activity. It is also vague in that it does not shed much light on what the "means" or capacity for undertaking a given activity might be.

The Humanist definition of technology is typified by Simon's (1973). He defines technology as the "knowledge of how to do things, how to accomplish human goals" (p.1110). A similar approach is adopted by the Announcement of the 7th General SAINT Conference, April 1976, which declared that "Technology must be given a broad

definition, something like the concious use of knowledge and experience to change reality according to human needs." (quoted in Galtung, 1979, 29, footnote 1). A Humanist definition such as these is preferable for three basic reasons. First, it brings to the fore the importance of knowledge in the process of accomplishing human objectives. Secondly, it unambiguously rectifies the erroneous perception of technology in terms of machines and palpable substances instead of knowledge stored in a variety of forms. As Simon rightly points out, "to view technology in terms of machines and tangible substances is to mistake the shell for the snail, or the web for the spider" (1973, 1110). Finally, there is the embodiment of the concept of human goals or needs. This is essential because technology must generally be related to the transformation of objects for the benefit of mankind.

It is, therefore, clear that these definitions go a long way towards offering a much clearer understanding of the concept of technology. Nevertheless, as can be discerned from these definitions they tend to be broad and therefore need to be narrowed down. Moreover, the definitions do not accord sufficient prominence to the element of "tool" which needs to be produced and utilized by human knowledge to satisfy needs. That this view is shared by Vincent, is evidenced by his "more down-to-earth definition" of technology as "the art of producing and using tools" (1984, 256), which also misses the crucial aspect of human needs. Galtung, similarly, finds the element of tool equally important. He defines technology thus, "technology = technique + structure" (1979, 15). Initially, tool only seem to be implied, but he goes on further to explain that the "technique" component of technology is constituted by "tools and know-how"

(Ibid.). Though Simon implied the element of tool in his definition especially when he referred to the "artifacts" of man, it was not highlighted enough to put it in the right perspective.

Consequently, we shall understand technology to mean the knowledge to produce and use tools to satisfy human needs either directly or indirectly. This necessarily implies the use of knowledge for the production and provision of goods and services respectively for human consumption. The satisfaction of human needs[1], it may be noted, makes the concepts of knowledge and tool not only crucial, but necessarily interwoven. They are interwined because the provision of human necessaries cannot be accomplished without both.

It is important to appreciate that in meeting societal needs knowledge and tools or technology cannot be neutral or exogenous. They are closely related to the social relations or mode of production. Indeed, as Leys rightly points out "technology is an aspect of those relations" (1984, 175). It is these relations or the "structure" as referred to by Galtung "within which the tools become operational, and the cognitive structure with which the know-how becomes meaningful" (1979, 15). So that the efficacy of technology in eradicating poverty and making a society "convivial" will, to a large extent, depend on either its compatibility or incompatibility with the relevant "structure". Thus the need to understand technology equally in terms of the "structure" or the social relations of production.

From our explanation of the concept of technology, it is clear that the concept can be classified, in fact it has been classified,

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1. See Galtung (1979) for a discussion on and classification of human needs. See also Duller (1982, Chp. 7) and Aryee (1984, 120-147).

into different categories. These include hardware and software, general, system-specific and firm-specific[2], and alternative, intermediate and appropriate.[3]

Technology, as has already been indicated, is both embodied and disembodied. The latter includes patent which forms an important aspect of this study. It is, therefore, appropriate to explain the legal nature of a patent in general and its economic functions.

Legal Nature of a Patent

A patent may be defined as a legally binding monopoly awarded by governments to inventors to exclude others from manufacturing, selling, or using the patented invention, without the patentee's consent, for a defined period of time[4]. This legalised monopoly can be discerned as a trade-off between the state and the inventor. To the latter, the grant of a patent monopoly expresses the "moral right" of inventors to their knowledge and financial rewards to be obtained from the exclusive exploitation of the patented invention. In return for the prompt disclosure of new inventions, which may assist the generation of industrial development, the state grants a limited exclusionary right to inventors. Limited monopoly in return for

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2. For a discussion on this classification see Hall and Johnson (1970).
3. See Jequier (1976) and Jequier and Blanc (1983) for definitions and illustrations of this distinction of technology. See also Stewart (1978, 99-108) for a discussion on appropriate technology.
4. See WIPO and UN's definitions of a patent in UNCTAD (1975a, 1).

disclosure is, therefore, seen as an incentive for industrial progress.

The grant of a patent monopoly right is usually made after an inventor has satisfied the necessary requirements provided by law. This will normally include application for a patent, payment of application fee, and the filing of relevant documents including a specification which must contain a complete and adequate description of the invention. In most cases, a patent is granted for an invention only after an examination of the patent application has confirmed it is novel, of inventive step and industrial applicability. It may be noted that the laws of various countries on all this may vary in details.

A patent grant confers on the patentee a proprietary right to his invention. A patent or an application for a patent, therefore, constitutes personal property and can be assigned, mortgaged, licensed, or pass from the patentee by operation of law. This contrasts with know-how whose proprietary nature is not legally recognised in countries with a codified system of law, and remains controversial in common law countries (see Correa, 1981).

A patent may be contrasted with an inventor's certificate. The latter, which is popular in East European Countries, gives to an inventor only the right to receipt of remuneration for the use of his invention while the exclusive right is transferred to the state. This means that, unlike an owner of a patent, a holder of an inventor's certificate cannot exclude others from the use of his invention.

The patent system or the award of a patent was conceived to stimulate domestic inventive activity, and particularly to encourage the individuals who were involved in this activity. There has, however, of late been a change of beneficiaries as originally conceived by the patent system.

Recent Trends in Patenting

It is now the case that big corporate firms are increasingly taking over inventive activity from lone inventors and thus increasing their share of patents to the detriment of the latter (Noble, 1980; Frost, 1965; See also Table 1:1). This trend is in the ascendant and the protection which was provided for the lone inventor by the patent system as originally conceived is now increasingly becoming the monopoly of the corporate firm.

Table 1:1

Share of Corporations and Individuals in Patents Granted in Selected Countries

Country and Year	Individuals	Corporations		
		Total	National	Foreign
U.S.A. (a)				
1982	21	78	45	33
1983	18	80	45	35
France (b)				
1964	23	73	18	55
1968	20	77	17	60
Chile (b)				
1937	50	49	4	45
1967	13	80	2	78
Argentina (b)				
1949	55	47	-	-
1967	23	77	-	-

SOURCE: (a) based on Statistical Abstract of the United States, 105th Edn., 1985 at P.536.

(b) UNCTAD (1975a, 39).

The dominance of corporate firms in this field has been associated with a number of notorious practices. Science-based industrial corporations by virtue of their capital are able not only to "buy" the best scientific brains, and other resources for undertaking unlimited R & D, but also to purchase patents of patentees who do not have the resources to exploit their inventions. Through this process as well as consolidation, patent pools and "the regulated patent production through systematic industrial research" corporations have been able to concentrate patents under their domain and thus expand their "monopoly of monopolies". In most cases they are able to dominate a given industry and this creates the very condition for its perpetual control. In such a case they control the "main stream of inventive thought" in that industry and can clog any further developments without their consent (see Noble, 1980, Chapt. 6 for examples including General Electric and others. Also see Vaitsos, 1972; Machlup, 1952; Frost, 1965; Vaughan, 1948; Kahn, 1948 and 1940). Thus, through the patent system industrial corporations are able to dominate industry and use this dominance to regulate competition which, instead of encouraging inventions, has the maximisation of profit as its ultimate goal.

While the effect of this dominance may adversely affect both the DCs and LDCs the impact on the latter may be more considerable. A disturbing aspect of this dominance and the ensuing monopoly is that the majority of foreign patents in the LDCs which are accounted for by corporate firms are not worked and instead used as import monopoly permits. This impedes production and innovation in these countries, particularly in industries to which the patent grant relates. In addition, this monopoly over imports excludes competition over the importation of the patented products unless of course there exist

non-patent infringing substitutes. This could result in increased payments for imports than would be the case if there existed competition.

In fact, studies carried out in the Colombian, Chilean and Peruvian pharmaceutical industries have revealed that over-pricing of imported patented intermediate pharmaceutical products in 1968 ranged between 17 and 6,584 per cent (Vaitsos, 1972, 86). However, Penrose (1973) suggests that such increases may be attributable to factors "such as brand-name protection, transfer pricing to subsidiaries or loss-making exports which would not be available on a continuing basis" (P.777). Similarly, Lall (1984) also seems to suggest that the basis of assessing such increases in prices may be wrong if it involved prices charged on intra-firm transaction with what would be charged by a "non-patent observing imitator", since an "innovating firm had to charge much more than an imitating one" (p.13). Nevertheless, no one will contest the fact that in the absence of competition import monopolies could lead to higher prices of the affected products.

Finally, apart from the fact that patents are suppressed by corporate firms (though some patents may not be worked for pure economic reasons) they are also used as "scarecrows" to ward off any potential local competitors from penetrating into the relevant fields. So the national patent system instead of encouraging domestic inventive activity has the opposite effect.

In spite of all this LDCs, like most other countries, still maintain a patent system and grant monopoly rights to inventors. The question then is what are the justifications for the patent system.

The Economic Functions of the Patent System

The underpinning rationale of the patent system is said to be the promotion of public welfare, which, according to Machlup (1952), is the ultimate objective of the grant of patent monopolies. It is believed that the grant of the monopoly privilege has a considerable positive influence on research and development (R & D), the speedy disclosure and spread of technical knowledge, the stimulation of innovation and the transfer of technology. All these activities which contribute to the acceleration of technological progress, it is further believed, help to advance public welfare.

Research and Development (R & D)

The generally received view about the patent system is that it spurs R & D through the provision of protection for inventors, and thus makes possible the breaking of new technological grounds by industrial concerns. It is similarly accepted that after new discoveries inventors and business enterprises are very cautious in the utilization of the new technologies especially when unsure of their economic results. The patent system, it is believed is a factor which contributes to spurring on the application of new technology, especially where the hazard of failure is considerable. So that, "when patents afford some exclusive rights to the new technique business cannot afford to be too conservative in research for and the application of the change" (Frost, 1965, 73). According to Machlup, the stimulation of R & D through the grant of monopoly rights "is the only sound justification for the patent system (1952, 281).

Through the grant of the monopoly right and the competition it is supposed to generate, the patent system is believed to accomplish technological advancement. The German chemical industry, it has been claimed, attained its advanced stage by about 1900 as a result of technical competition within the dye industry which followed the German patent law of 1876 (Frost, 1965, 73-4). Similarly, the rapid development of the electrical power industry, the more efficient utilisation of crude oil in the production of gasoline and the creation of the petrochemicals industry all in the U.S. have been attributed to the competition generated by the patent system (Ibid.). In addition, the stimulative effect of the patent system is said to have influenced the research which resulted in the development of aureomycin which later served as the basis for the development of tetracycline (Referred to in Hamza, 1984).

Nevertheless, the encouragement that patents provide for R & D as well as the application of new techniques in the fields of human existence may, in some cases, not be as considerable as it is sometimes made to appear. Two recent studies undertaken in Australia seem to confirm this. One of these is Llewellyn's (1981) survey, by way of questionnaire, of large domestic firms which account for about 80 per cent of Australian R & D expenditure. The responses to the question "whether potential patentability is a decisive criterion in the decision to go ahead with a particular research project..." indicates that the influence of the patent system on R & D expenditure is not strong.

> Of the 69 responses, only 9 (13%) indicated that potential patentability was, in more than a few cases, a decisive criterion in deciding whether to go ahead with a particular research project. (P.394).

In respect of the question regarding the proportion of R & D that would not have been carried out if patent protection were not available, the entire results were close to the above.

> Of the 61 responses to the question, 44 (72%) respondents replied that it would make no difference... A further 4 respondents (6.6%) reported that up to 5% of their R & D in recent years would not have been carried out if they had not been able to patent any resulting discoveries. (Ibid.).

The above revelation is supported by the more recent survey by Mandeville et al., (1982) into the effects of the Australian patent system. The findings of both surveys are consistent with the results of earlier studies by Firestone (1971) on Canadian industrial R & D activities and Taylor and Silberston (1973) on U.K. manufacturing firms.

While it appears from the above that patents may not serve as a significant incentive for R & D, their impact here, as revealed by Taylor and Silberston (1973) and to some extent Llewellyn (1981), may vary according to industry. In their survey of the effects of the patent system on R & D within U.K. industries, by way of questionnaire and followed subsequently by discussions with the firms involved which helped them to quantify responses on the subject more precisely, the useable returns which were obtained for 32 major activities or class of production in 27 companies revealed the following:

> The six returns in which R & D was thought to be substantially affected were in the fields of pharmaceuticals (2), crop chemicals, special industrial chemicals, heavy industrial plant and automotive components. The majority of mechanical

> engineering firms felt that their R & D was not at all sensitive to patent protection, certainly so far as its overall size was considered. The two man-made fibres firms believed that their R & D was probably very little affected. (P.197, also see Table 9.1).

Similarly, Llewellyn's (1981) survey found a varying effect of patents on R & D in different industries (See pp394-95).

It may also seem that the impact of patents on R & D may vary according to the size of the firm or inventor. The results of the study of Mandeville et al (1982) and an important IFO study in Germany which studied 1239 patents of German companies (See Gerstenfeld, 1977), though conflicting in some details, reveal that the stimulative effects of patents on R & D vary according to the size of the firm or inventor.

All this demonstrates that the omnibus argument of patent protection serving as an impetus for R & D or not may not be applicable or true of all industries.

It is equally significant that besides the fact that the patent incentive is not generally a very crucial determinant for industrial R & D activities or less important for a number of industries, its stimulative effect has increasingly become very doubtful so far as R & D in the LDCs is concerned. For nationals to be able to undertake effective and purposeful R & D and benefit from the protection of the patent grant they must be research oriented. This, ultimately, is determined by the level of education or skills in the technical and science fields and the overall climate for R & D which includes

government policy on science and technology. The low level of technical competence as well as passive government policies on science and technology could, for example, be discerned from the expenditure governments in the LDCs commit to R & D (See Table 1:3). All this contributes to explain the dearth of personnel engaged in R & D activities as demonstrated by Table 1:2. Though the table shows a gradual growth in R & D engineers and scientists in the LDCs the increase is not enough to have a fundamental effect on R & D in these countries.

Table 1:2

World Region-Distribution of R & D Engineers and Scientists

Year	World Total	LDCs percentage	DCs percentage
1970	2,608,100	7.9	92.1
1975	3,236,900	8.9	91.1
1980	3,756,100	10.6	89.4

SOURCE: Based on UNESCO Annual Statistical Yearbook, 1984, p.v. 19.

It is worth mentioning that in spite of the yawning gap between the manpower resources of the LDCs and the DCs, the situation in the former is constantly being exacerbated by what has generally been referred to as "reverse transfer of technology" or "brain-drain". That is the outflow of skilled manpower from the LDCs to DCs which is generally attributed to income differentials, inadequate professional opportunities and working conditions, and the social conditions in the LDCs (See UNCTAD, 1979). This implies a considerable loss of human capital and an important diminution of LDCs' technological capacity.

In addition to the paucity of scientists and engineers, the inadequate expenditure on R & D in the LDCs also accounts for the limited amount of inventive activities in these countries. Table 1:3 similarly demonstrates the limited expenditure undertaken by LDCs on R & D. This will, in the same vein, restrict patenting activities.

Table 1:3

R & D Expenditure in US$ million

Year	World Total	LDCs percentage	DCs percentage
1970	62,101	2.3	97.7
1975	113,815	3.9	96.1
1980	207,81	6.0	94.0

SOURCE: Based on UNESCO Annual Statistical Yearbook 1984, p.v.19.

Until all this is rectified to enlarge the science and technical manpower engaged in R & D and for Governments to spend a little more on R & D to enable the investigation of societal and human problems aimed at satisfying human needs and thus come out with new inventions patent per se as a spur to inventive activities may achieve very little.

Disclosure and Spread of Technical Knowledge

The patent system, it is argued, encourages the disclosure and spread of technical advances, and thus erases a crucial retarding

factor - secrecy - in technological progress. It makes possible the uninhibited flow of both pure and applied scientific knowledge which is fundamental to increased rates of progress and best employment of scientific resources. This disclosure and spread of technical information is accomplished by the application of the invention in a patent specification, which describes the invention and the problem it is meant to solve, as well as the procedure for the application for a patent grant. After the grant of a patent the knowledge in the specification becomes available to the general public, though itself protected from imitation. In addition, licensing of patents also assists in spreading technical knowledge (see below for discussion).

The discouragement of secrecy in technical progress through the grant of patent monopoly has been doubted and contested by writers including Plant (1934), Machlup (1952) and Taylor and Silberston (1973). They have argued that people take out patents only when they cannot hope to keep and profitably exploit their secret technology. So that where certain secret technologies or formulae - say the case of Coca-Cola - can be kept secret for an unlimited period of time patents become unnecessary.

Moreover, the disclosure of technical knowledge as a justification for patent grant has been brought into disrepute by practices that seem to be associated with descriptions of inventions in patent specifications. On the one extreme, as Bloxam (1972) remarked:

> It is possible to obscure the issue by the very wealth of information he supplies. Although he must describe the best method, he does not have to identify it. For example, in a chemical case he may at the same time strengthen his legal and his commercial position by

> giving a wealth of experimental examples to support his patent claims while leaving it to the reader to discover which one is the commercial winner (P.17).

On the other extreme, as Gilfillan tersely stated:

> It is possible, and often done despite the law, to write patents most obscurely, and to leave out essential details, such as which catalyst is best, among many listed as usable. (P.60).

All this as well as the fact that quite frequently crucial technical know-how necessary for the most efficient exploitation of an invention on a large industrial and commercial scale is not divulged in a patent specification render the public disclosure justification unconvincing.

While the inadequate and incomplete disclosure of an invention may in some cases be deliberate it is also believed that the practice of "first to file" associated with the patent system, by which it is essential to obtain an early priority date, may account for this (see Taylor and Silberston 1973, 95). In effect the non-disclosure of certain essential information in a patent specification may not necessarily be deliberate but may reflect the fact that the requisite information may not be available at the time of filing or is "simply too cumbersome to put into a specification". However, it has been the practice for the rational inventor to patent his invention, where know-how is very necessary for its successful working rather than keep it secret. In such a case he is not only a beneficiary of some element of security for his invention, but also of some control made possible by his secret know-how.

Nevertheless, technical disclosure through the grant of patent monopoly may appear to be more useful by way of providing novel technical knowledge which could serve as a basis for further R & D

than enabling the exploitation of an invention. This, according to Beier (1972), is the "modern function of disclosure". The patent system has in this respect been quite useful. Evidence of the patent serving as a source of information for solving technical and industrial problems has been given in connection with some manufacturing firms in Canada (see Patent Technical Information Services Project Report, 1981). These include Pounder Emulsions Limited, Senstek Corporation, Saskatoon (Saskatchewn), Bush-Hog/Melcam Corporation, Imperial (Saskatchewn), Morris Rod-Weeder, Yorkton, and British Columbia Research, Vancouver. In all cases these firms found patents as valuable source of technical information which helped in solving some of their industrial and new products development problems (Ibid).

While patents may be a useful source of technical knowledge for the above Canadian firms and others this may not be so for all firms and industries. For example, in a study carried out in the U.K. by Taylor and Silberston (1973) it was revealed:

> Most firms.... said that specifications were of 'some value' to research staff on technical details and to management on general research trends and the work of competitors, but less than a third of these were prepared to term these benefits 'substantial'. Those that did so were in chemicals, machinery and man-made fibres, while respondents in electrical engineering were on the whole very sceptical (p.212).

It may seem on the whole that as a source of technical information patents are useful. However, the degree of their usefulness, it will appear again, may vary between industries. Consequently, there may be

the need for a similar segregation of the various industrial activities in the assessment of the impacts of patents in this respect.

Innovation

The patent system can be said to stimulate innovation - the first introduction of new products and processes on a commercial scale, or the entire process of converting inventions into full scale productive operations including investment in new plant and equipment for the process. Innovation may also encompass marketing and managerial changes. Thus, besides product and process changes, it includes changes with wide-spread social and marketing impacts which have a low technological content. (See Lowe and Crawford, 1984, Chapter 3).

The innovation process is believed to be the most difficult stage of the entire technology development process, and can be said to be not only very expensive but also extremely frustrating. An example here is Barker's (1977) account of the expenditure and frustration, and the cliff-hanging periods which the development of the Pilkington Float Glass incurred and experienced. The innovation process is also fraught with potential risks. These may be "technical" or "market" risks. The technical risk reflects the likelihood of the invention development resulting in no saleable output, and market risk concerns the possibility of a commercial failure (Parker, 1978, Chapt. 4). If the invention development leads to no saleable products then the innovator stands the risk of losing funds which have been committed to the development of the products in the hope of future profits. On the

other hand, if it results in saleable output and there does not exist a market for it the same consequences will befall the inventor.

The uncertainty concerning the desired market for products can have a negative impact on innovation. In fact, inadequate market for products has in some cases resulted in industrial upsets for a number of research-oriented companies. The recent example of Sinclair Research of the U.K. is very illustrative. The inadequate market for Sinclair computers and flat screen television sets resulted in about £30 million build-up of these products and the company's inability to meet its financial obligations. In an attempted rescue bid that followed the founder of the company eventually lost control of it (See "Financial Times", 18 June and 10 August 1985, "The Times" of 18 June and 10 August 1985, and "Financial Times", 8 April, 1986).

All these make the innovation process a very trying one, and thus the need for some guarantees and safeguards for its undertaking. The patent system it is believed, can provide some of these safeguards, and in this way serve as an impetus for product or process development. This is made possible by the guarantee and security provided by the patent monopoly grant to firms to reap reasonable profits from investment by excluding imitators from copying the invention during the patent protection period. The monopoly privilege is also believed to spur firms to undertake the cost involved in the establishment of new plants and equipment as well as the training of and mastering by technical personnel of new plants and techniques necessitated by the new technology.

A recent study by Mansfield et al. (1981) of the imitation costs in respect of 48 products innovation sheds some light on the impact of patents on innovation. In their survey, they asked each of the innovation firms in the chemical, drug, electronics and machinery

industries whether it would have introduced each of its patented innovations in their sample if patent protection had not been available. Their findings were as follows:-

> According to the firms, about one-half of the patented innovations in our sample would not have been introduced without patent protection. The bulk of these innovations occurred in the drug industry. Excluding drug innovations, the lack of patent protection would have affected less than one-fourth of the patent innovations in our sample (P.915).

While it will appear that most of the 48 products rested on patent protection, this was more crucial to the pharmaceutical industries than the others. These findings are consistent with those of Mandeville et al.,(1982), Llewellyn (1981), and Taylor and Silberston (1973).

Moreover, Mansfield et al. (1981) study revealed that despite patent protection innovations seem to be imitated often and quickly (P.913; see also Mansfield, 1984, 143). Nevertheless, patent protection was found, generally to increase imitation costs. In the drug industry patent had a bigger impact on imitation cost than the others. The median estimated increased cost due to patent protection was about "30% in ethical drugs, in contrast to about 10% in chemicals and about 7% in electronics and machinery" (1981, 913). Finally, they found out that though patents increased imitation costs the increase was not enough to have an appreciable effect on the rate of entry.

It may also be mentioned that the impact of patents on innovation may vary according to the size of the firm or investor. The studies of Mandeville et al. (1982, 101-102) and Macdonald (1982,

referred to in Mandeville, P.102, fn. 14) reveal that smaller firms attach more weight to patents for their innovation processes. Nevertheless, the lack of adequate capital by smaller firms or inventors, it is believed, has for a considerable period of time adversely affected their innovation processes (See Grundman 1970-71; and Vaughan, 1925).

Transfer of Technology

The patent system is generally believed to effect the transfer of technology, and it is this belief which seems to influence the continuous participation by the LDCs in the international patent system. It is important, however, to note that patents per se do not effect technology transfer (see Vaitsos, 1973; and Vincent, 1984). Instead they may affect or influence the transfer process. It is believed that the existence of the patent system in countries does not only make it possible for patentees to register their inventions in other countries but also provides some guarantee and security to foreign owners of inventions to license them there. Though patents can influence the transfer of technology through a number of conduits, the major ones, it will appear, are the disclosure of the invention in a foreign country, imports of patented products, foreign direct investments (FDIs) and joint ventures, and patent licensing.

Disclosure and spread of technical information is one of the functions of the patent system. However, as a result of the shortcomings of patent disclosure already discussed, it is not an efficient mechanism for transferring technology, especially to the LDCs which lack high level technical personnel. This is further exacerbated by the very set up of the patent offices in these

countries, which in a number of cases only register inventions and ignore the crucial role of a technology data base. (See Chapters 5 and 7).

Another channel through which patents transfer technology is through the imports of patented machinery goods or patented products. The transfer is brought about through the use of the technologies present in the goods directly by the consumer or indirectly as a basis for further processing (Grief 1981, 53-54). This helps to set off a learning process which results in an increase of technical knowledge and ability to solve technical problems. Nevertheless, the importation of patented products to a patent granting country is not very popular with most LDCs because of reported cases of abuses of the patent monopoly import permits by foreign patentees (see above).

Foreign patenting, it is argued, promotes FDIs and joint-ventures. The basis for this is that foreign firms would be unwilling or hesitant to set up manufacturing plants using patented technology in countries where patent protection was not available. Similarly, and for the same reason such firms, especially those providing technology may be reluctant to enter into joint venture arrangements with indigenous firms. Thus, the presence of patent protection makes possible FDIs and joint ventures. The validity of this argument is difficult to determine because the evidence that exists, as Penrose puts it, is mainly "testimony" (see Mandeville et al. (1982) findings).

Finally, patent licensing is another conduit through which the patent system affects the transfer of technology. Through this means licensees, who could otherwise be prevented from working inventions of patentees, are legally permitted to do so. This transfer is made possible by the legal protection given by the patent to the inventor

which guarantees his title and exclusive right to the technology. It is also believed that the legal monopoly of the inventor also makes it possible for him to license the accompanying know-how which together enable the efficient and effective exploitation of the new technology (See Taylor and Silberston, 1973, 214). It may be pointed out here that because of the absence of licensees who may possess the requisite expertise and resources to exploit licensed invention on their own, pure patent licensing as a technology transfer mechanism is not very common in the LDCs. In actual practice, in these countries, patent licensing always goes together with that of know-how.

Restrictive Practices in Patent Licensing

In the licence of either their patents alone, their patents together with know-how or their patents as part of an entire investment package, patentees or licensors usually insist on the inclusion of certain restrictive clauses which affect the exploitation of their technologies. This is done mainly to prevent the encroachment on their rights and industrial activities, and to enhance their economic gains. These clauses include (a) export prohibition, (b) grant-back or improvement, (c) tying arrangements, (d) price fixing, (e) field of use restriction, (f) no-challenge and (g) minimum royalty payments.

Export Prohibition

Among the most frequent clauses found in patent licensing agreements is the export prohibition clause. Export prohibition may be absolute or not. An absolute export prohibition is one which

restricts production and sale only to the territory or country of the licensee. The non-absolute prohibition, on the other hand, is that prohibition which confines the production and sale to the licensee's territory and other neighbouring or specified countries. These two types of prohibition are common not only in patent but technology licensing contracts in general. A third and novel export prohibition, which the author in the course of his research into technology licensing agreements in Ghana found, is what I shall term as internal market sharing restriction. By this, in addition to the export prohibition, the market (i.e. the country or territory) of the licensee is partitioned between him and the licensor (For further discussion see Chapter 5).

Export prohibition clauses occur in a number of LDCs' licence agreements with foreign licensors (see tables 5:4; 7:7 and 7:8. See also UNCTAD 1975a, P.21, Table 1). Some developed countries are reported also to experience these clausesin their license agreements. (For Poland's experience see Janiszewski, 1983). These clauses are usually inserted in patent or technology transactions in order to preserve the licensor's market and to shield him from competition from his licensees. Moreover, for the patentee or technology supplier this clause is useful in dividing up the international market which enables him to lease his technology in as many territories as possible. This certainly implies a number of different sources of royalties or fees. In addition, it is believed that such clauses ensure that licensees of licensors who are parties to cross-licensing agreements do not enter the markets apportioned to patentees who are also parties to such agreements (Vernon, 1957; also see Vaitsos, 1972). Thus a licensor ensures that his patented technology is not employed by his licensee to frustrate or compete with his competitor in his apportioned "home market".

For the licensee such a restrictive practice may have diverse negative effects on its operation. Such a practice generally has the effect of restricting the production and sale of goods produced by the foreign technology to the market and other neighbouring markets of the recipient firm or country. Consequently, industries of the receiving countries of which the majority are LDCs are compelled to maintain production at a minimum, and thus unable to effect a fuller exploitation of the licensor's invention. Similarly, export prohibition clauses make it very difficult for LDCs to develop export orientation and capacities which will enable them to compete in external markets. The effect is that they stand to be deprived of hard foreign currency. This is significant since payments of royalties for the necessary inventions, equipment or know-how are almost always expressed in terms of foreign currencies.

It must, however, be pointed out here that the exclusion of an export restrictive clause in a patent licensing agreement will not necessarily result in actual export by or export potential of the receiving firm or the licensee. In reality, much will depend on factors such as the productive and marketing capacities of the firm, its relative competitive position in export markets as well as its export horizon. In other words, as put by one UNCTAD (1971c) report, "... it is only when an enterprise can meet domestic requirements and can supply externally under competitive terms and would in fact export given the chance that export restrictions would limit the firm's commercial activity" (P.12).

Nevertheless, as tersely stated by the same report, ".... in the longer run the presence of export restrictions may discourage investments in new production facilities and perhaps make unit cost higher than would otherwise be the case through keeping production at

sub-optimal levels" (Ibid). The non-prohibition of exports could, therefore, constitute a necessary, if not sufficient condition for export capabilities by licensee firms.

The other significant consequence of an export restriction, especially in connection with integration schemes in both the developed and developing world, is that it tends to stultify the creation of a common market and impedes endeavours to integrate the respective economies of the participating countries through the increase in intra-regional trade. This explains the hostile attitude adopted by the E.E.C. and the Andean Pact[5] to this and other anticompetitive practices. With the occurence of this and other clauses, as will be shown later, in Ghana, Nigeria and other West African countries ECOWAS may soon have to adopt similar attitude if it is to succeed in increasing inter-community trade.

Grant Back or Improvement Clause

Another clause which also occurs in licensing agreement is the grant-back or improvement clause. This clause obliges the licensee to grant to the licensor, for a consideration or not, the rights to the use of improvements, variations or other new inventions that are developed by the licensee in the process of utilizing the licensed invention. Grant-back clauses are in most cases either absolute or mutual. They are absolute where the licensee is obliged to transfer any improvement made on the licensed invention or technology or an invention developed on the latter as well as the accompanying rights therein to the licensor, and mutual where there is a reciprocal exchange of improvements between licensor and licensee.

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5. See EEC Anticompetitive Regulations and Andean Pact Decision 24.

Absolute grant-back clauses are offensive in that they do not only deprive licensee firms of their legitimate rights to such improvements or inventions but also make them worse off because of the money expended for their undertaking. Furthermore, they reinforce the dominant position of the licensor and also stifle the incentive of licensee firms to invent or undertake R & D geared to improving upon or modifying the licensed invention to their peculiar environments. For LDCs it is unfair that exploitation of technologies which have been improved upon or modified to suit their environments should be impeded by such clauses. The debilitating effect of such clauses, however, on industrial activities of LDCs is crucial only if there actually exists in these countries the technical expertise to improve, modify and adapt foreign licensed technology or invention.

Mutual grant-back clauses appear to be more reasonable and acceptable because they permit the exchange of improvements between the parties which keeps them abreast of recent developments in the state of the art. However, in some cases, they may only be an escape-mechanism from the incursion of anti-trust or anti-competitive sanctions. About 88% of 42 contracts entered into with Spanish based firms studied by UNCTAD (1974a) contained improvement clauses which appear to oblige both licensor and licensee to communicate full information on technical improvement on the licensed technology to each other. This arrangement seemingly attractive is deceptive in that it is not the same as reciprocity of treatment. In fact, the terms on which the information is communicated tend to be highly unfavourable to the Spanish based firms. The UNCTAD report on the study of these contracts identified four aspects in which the bargain is unequal. They are:

> First, Spanish access to foreign improvements is in most cases under the same terms and conditions as the original contract, i.e. the Spanish enterprise pays for the improvements. Second, the foreigner always obtains improvements emanating in Spain free of charge. Third, and fundamental, is the fact that the Spanish improvements nearly always become the industrial property of the foreigner. Fourth, though almost inevitable after the previous point, is that foreign corporation retains global right to sub-licence the Spanish firms' improvements, usually on a non-exclusive basis (P.33).

The totality of the above identified factors amply demonstrates that the presence of the mutual improvement clauses is spurious. The only benefit derivable by the licensee firms is that they could use their improvements or innovations without paying for them. It may, therefore, be inferred that the presence of mutual or reciprocal exchange of improvements in licensing agreements are not, in some cases, backed by genuine desire of licensors to have access to improvements and to keep abreast as well as feed licensees with the recent developments and improvements in the state of the art (i.e. the licensed technology), but rather to evade the rigorous anti-trust measures now hunting MNCs.[6]

As a result of all this, grant-backs, especially those which are not genuinely mutual are found unacceptable. However, Contractor (1981) in disapproving the inclusion of a grant-back clause in patents

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6. This does not mean however that all MNCs are guilty of this. For MNCs policy on grant-backs see Contractor (1981).

and generally technology transactions believes that, "it.. betrays the idea that, however improbable, there may be an important technical breakthrough or commercial application not yet discerned by the licensors' technicians." (P.94). This objection appears to me to be frivolous because technology development is an ongoing process and experience has shown that novel technology is generally susceptible to further development. A more forceful argument against the grant-back clause is its inherent inequitableness. As Kahn (1940) rightly points out "invention is a group process, the individual contributions being relatively minor" (P.476). It is, therefore, wrong for a given "actor" in the process to demand an exclusive right to improvements of inventions based on his work which was also an improvement or an invention based on the work of others. Clearly grant-back clauses, particularly the absolute type, are among the most unjustifiable clauses in patent licensing agreements.

Tie-in Clauses or Tying Arrangements

It is a common feature in the licensing of patented technology for a licensor to insist that the licensee acquires non-patented goods from him only or other specified exclusive sources as a condition of the patent. This practice is similarly common in know-how licensing agreements. In the case of the licensing of a patented process the licensor may reserve to himself the exclusive right to supply materials for the initial exploitation of the said process. This may be justified on technical grounds. For example, it may be the case that it is the licensor's material alone which may be good enough to enable a satisfactory and reasonable working of the process.[7]

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7. See for example the cases of Dehydrating Process Co. v A.O. Smith Corpn., 292, F.2d 653 (1st Cir. 1961); U.S. v Loew's Inc. 371 US38 (1862); 9 L.Ed 2d.11.

Tied-purchase clauses are also common in cases where there is the need for guaranteeing the quality of the manufactured good by the employment of specific units, especially where foreign brand names and trademarks are involved. Nonetheless, technology suppliers, in some cases, use the tie-in clause essentially to maximise their profit margins. The inclusion of this clause in patent licenses for such a motive unreasonably extends the patent monopoly.

The implications of tie-in clauses for recipient countries, especially LDCs, have been sufficiently spelt out by UNCTAD (1972b) as follows:

> When contractual agreements tie part or all of the inputs to a single source of supply, developing countries are deprived of the possibility of exploiting market opportunities and are faced with a price structure determined by the unique supplier. Tied purchase provisions thus result in a monopoly control of the supply of equipment and other inputs by foreign enterprises, leading to what has come to be known as 'transfer pricing', 'transfer accounting', or 'uneconomic output'. By reason of his exclusive position, the supplier is able to charge higher prices than for comparable equipment and other inputs that could otherwise be obtained elsewhere. Overpricing of inputs in this way constitutes a 'hidden' cost of the transfer of technology, the effects of which are much the same as those of aid-tying. (P.27).

Moreover continued the report:

> Tied-purchase clauses connected with the transfer of technology not only affect production costs through the overpricing of inputs but also may have important indirect effects on the import substitution, export diversification and growth efforts of developing countries (P.29).

The above quotations fully and directly touch on the core implication of tie-in clauses. It may be added that the structure of the market for intermediate and other inputs which are tied to the sources of technology by the licensor has implied an increasing dependence on imports of capital goods and intermediate outputs.[8] This creates a perpetual dependency relationship between the licensee firms in the recipient countries and the original licensor, and thus makes little room for freedom of action by the former. A number of LDCs find themselves in this dilemma. In Latin America for example only a few countries such as Argentina, Mexico and Brazil have been able to accomplish, in certain sectors, considerable "backward-linkages" in domestic production (UNCTAD, 1971c, 14). It must be noted that despite all these adverse effects, LDCs still experience in

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8. See for example, the share of intermediate industrial inputs of the total imports of the Andean Countries, in UNCTAD (1971c).

their licensing agreements tie-in clauses.[9]

An interesting aspect of tied purchase clauses revealed by Table 1:5 relates to ownership of the technology receiving enterprises. The table seems to suggest that the proportion of tie-in arrangements is highest in cases of licensing arrangement with non-affiliate enterprises. This is followed by cases in which foreign enterprises have a minority participation in equity. The clauses are least widespread or prevalent with regard to subsidiaries of foreign companies. A caveat, however, needs to be issued here. That is, while this seems to be the general trend the supporting evidence is not adequate enough. It is imperative to note, however, that the infrequency of tie-in clauses in technology transactions involving subsidiaries of foreign firms may be attributable to the degree of foreign control over such enterprises which makes "tie-ins" and other clauses superfluous.

Table 1:5

Provisions for tied inputs according to type of ownership of the technology-receiving enterprises in India and the Philippines

	Nature of Foreign Participation		
Country	Subsidiary	Minority Capital	Licence Agreement
	In Per cent of total for the group		
India	10	10	20
Philippines	9	25	58

SOURCE: UNCTAD (1972b, 26)

9. For figures on Ghana and Nigeria see Table 5:4 and 7:7 respectively.

Price-Fixing

Included in patent licensing agreements are clauses which empower a licensor to impose on his licensee restrictions concerning the sale price of patented products or products manufactured by the patented technology or process. The obvious consequence of this restrictive practice is that it pre-empts the licensee firm from fixing its own prices as reflecting the production cost of its own goods. In addition, the imposed price may have no bearing on the recipient firm's internal market conditions, thus ignoring the forces of supply and demand. Finally, in cases where the dictated price is higher than that of other competing products (e.g. imports from licensor and other sources) this is likely to have an adverse effect on the operations of the licensee firm. Though price-fixing clauses still occur in licensing agreements involving LDC licensees they are not as frequent as those already discussed (See Table 7:7; also see UNCTAD, 1972b).

Field of Use Restriction

A "field of use" restriction[10] is one whereby the licensor of proprietary technology restricts the licensee as regards the scope or field in which the latter may employ the technology or licensed product. In such a case the licensee is obliged not to engage in the manufacture and sale of products other than those covered by the licence. This practice is sometimes employed by licensors as a vehicle for the allocation or division of markets. It also has the

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10. For the classical patent position with regard to field of use restriction see Melville (1972, 18).

effect of restricting the use of the licensed technology. It may, however, be pointed out that this restriction may, in certain cases, be explained by the genuine use to which the licensed technology is to be put.

"No Challenge" or "No Contest" Clause

Patent licensing contracts may also embody the "no-challenge" or "no-contest" clause. By virtue of this clause the licensor is able to forbid the licensee from challenging the validity of the patent under which he is licensed during the life span of the agreement. This clause appears to be in accord with the common law doctrine of estoppel whereby a party to a contract is estopped from denying or challenging the validity of a contract which he freely enters into. In the case of patents the no-challenge clause seeks to forestall a state of affairs in which a licensee is able to avoid a bargain he had made by contesting the validity of the patent under which he is licensed while simultaneously enjoying the benefits derivable thereunder.[11]

In addition to estoppel, Bloxam (1972) suggests the application of the doctrine of "caveat emptor" in patent licensing. The marriage of and extension of the doctrines of estoppel and caveat emptor to patent licensing contracts will certainly exacerbate the already weak position of the licensee for a number of reasons. First, the

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11. See the reasoning of the California Supreme Court in Lear v Adkins 395 US 653 (1969), 162 US PQl. This court's judgement was subsequently rejected and reversed by the U.S. Supreme Court.

commodity involved in such a transaction is technical information the worth of which the licensee will not be in a position to evaluate till he has entered into a contract involving this same information. Furthermore, it is just not enough to warn a licensee to be aware of an impalpable commodity which he cannot examine until he has agreed to purchase. It will, therefore, be unjust and inequitable to tie down a licensee to a commodity which before the purchase was not only impalpable but also inaccessible, and which after it had become palpable and accessible had been found to be worth nothing.

The no-challenge clause, is normally used by licensors to maintain considerable restrictions on competition in conjunction with patent licenses especially where they realise the relative weakness of their licensed patents (See Cawthra, 1973). Another effect of this clause is given by the EEC Commission. This practice, according to the Commission:

> ... involves a restriction on the licensee's freedom of action which is not covered by the essential character of the industrial property right; for it takes from him the power to challenge the validity of the contract in order to reduce the royalites and to have certain restrictions removed which could strengthen its competitive position while improving that of third party undertakings interested in the manufacture of the article under licence as well as that of users.[12]

The no-challenge clause, therefore, is not only anti-competitive, but

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12. Decision of the EEC Commission in the Case of Raymond v Nagoya Rubber (1972) CMLR.D45.

it also enables licensors or patentees to enjoy privileges that extend beyond those provided by the patent grant. In addition, its restrictive effect may extend beyond the licensee to other third party undertakings and users of the end product of the licensed technology. It is no wonder, as we shall see in due course, that this clause is becoming increasingly impermissible by licensing requirements of many countries.

Minimum Royalty Payments

International patent licensors in the licensing of their patents also stipulate a minimum level of royalty payments irrespective of whether at the time the payments become due the patented technology is actually being exploited or not.[13] Though royalties on sales, for example, must assume some production, it is possible that owing to technical problems and other factors actual production may not take place for some time while royalties will be due and thus have to be honoured. Minimum royalty payment clauses are also quite common in licensing agreements involving LDC licensees. (See UNCTAD, 1972b and 1975a). Though these clauses may be useful for the LDCs by encouraging rapid use of the licensed technology, such use may, owing to technical difficulties, never exist, and thus put more burden on their economy.

In some instances where a guaranteed or fixed minimum payment is not demanded of the licensee, the licensor imposes on the former most often improper royalty formulae. For example, in a licence agreement covering a patented machine, the licensor demanded royalties on the

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13. See Hazeltine Research, Inc. v Zenith Radio Corp., 395 U.S. 100, 135.

use of the machine after the expiration date of the patent, as well as before. The U.S. Supreme Court did not hesitate in holding the imposition of such a royalty obligation for post-expiration use of the machine as an unlawful effort by the patentee to extend the term of his monopoly beyond that granted by law.[14]

In other cases, some of which may concern policy decisions of a licensee's government, guarantees are required of the licensee. Where guarantees are not demanded the contract would usually include provisions which make the licensee or domestic enterprise liable to compensation for lossess suffered by the licensor with respect to official policy (UNCTAD, 1972b). All this is not confined to only patent but technology licensing agreements in general.

So far we have endeavoured to explain the concept of technology, the legal nature and economic functions of patents as well as some restrictive practices in patent licensing. Having done so we shall now proceed to examine the transfer and indigenous development of technology.

TECHNOLOGY TRANSFER AND THIRD WORLD DEVELOPMENT

The problem of transfer of technology, especially from the developed to the less developed countries, is deeply rooted in the international division of labour, which has developed the advanced countries of modern industry, and which, by definition, explains the role of the LDCs as producers and suppliers of tropical food, minerals and agricultural raw materials with little or no domestic manufacturing industries.

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14. See the case of Brulotte v Thys Co., 379 US29 (1964).

The international division of labour, on the other hand, it is argued, is a product of imperialism.[15] The phenomenon of imperialism, which basically involves the search by capitalist firms for surpluses and the use thereof in incorporating new areas of the world economy into their system of accumulation, encompasses the entire range of production relations. It is also intimately associated with the export to the perpheries of capital used for the exploitation of the natural resources of the latter for the consumption of the metropolies.

With imperialism at its maturity and territories coming under the domain of the capitalist countries, they initiated and urged, and where necessary forced the cultivation of crops and exploitation of minerals required by the home economy. Systematic colonial investment provided the underdeveloped world with a handful of primary commodities for export, instead of concentrating on meeting the need of the colonies, and thus transformed them into the farms and mines of the metropolis.[16] It is no wonder that the economy of most of the third world countries which experienced imperialism and/or colonialism bear the characteristic of either monocrop or bi-crop.

It is obvious, therefore, that the development of colonialism led to the control of the economies of the LDCs and made them complementary to the metropolitan economies. It also accentuated the international division of labour. So that during that period it

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15. See, for example, the views of Sweezy (1970) and Nabudere (1977) as opposed to Warren (1980).

16. For some evidence on India see Brown (1974), on Ghana see Howard (1978), and on Nigeria see Williams (ed) (1976) and Onimode (1982).

became more prominent that while the peripheries were made to concentrate on the production of raw materials the centres or capitalist countries were able to develop manufacturing industries and exporting manufactured goods to the colonies and other peripheries. All this put the peripheries in a disadvantageous position. Thus, imperialism and its resultant international division of labour did not only contribute to the impoverishment of the LDCs, but also accounted for their present industrial backwardness.

In their desire to rectify this situation most LDCs' economic strategies are directed to altering the structure of their economies by a considerable increase in the share of manufacturing in national output and by similar changes within the manufacturing industrial structure itself.[17] For the successful realisation of this the LDCs must possess the requisite technology as well as the technological infrastructure and competence all of which they lack. Consequently, it has become necessary for them to import them.

Clearly, the LDCs' interest in bridging the technological gap with the developed countries has been considerable since the post-colonial era. It is interesting to note, in this respect, that the international community has since the beginning of the sixties - the first United Nations Development Decade - made efforts to confront the problems of the transfer of technology to the developing countries, particularly in obtaining better terms, and easier access to developed countries' technology (UNCTAD, 1970). An integral part of these efforts was the debate for the reform of the patent system. In this direction, for example, as early as 19 December 1961 the General Assembly by its resolution 1713 (XVI) called for a study of

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17. Some economists find these goals unexceptionable. For a discussion see Singh (1982).

the patent system and how it affects technology. In response thereto a study entitled "the role of patent system in the transfer of technology to developing countries" was published in 1964 (UN, 1964). This study dealt, inter alia, with the transfer of both patented and unpatented technology to the LDCs as well as "the ability of the latter to adopt and use such foreign technology in the implementation of their development programme" (UN, 1964). It is instructive to note that preceding all this was the call for the reform of the patent system by writers such as Kahn (1940 and 1948), Vaughn (1948), Penrose (1951) and Machlup (1952).

Among the bold formal expressions of this concern is the ratification of the International Development Strategy of the Second UN Development Decade in October 1970 which recognised the need to control the international conventions on patents, easier access to patented and unpatented technology at better terms, simple use of technologies appropriate to development strategies of LDCs and the encouragement of the development of indigenous technologies in the LDCs. This was followed by subsequent international meetings such as the sixth special session of the UN General Assembly in 1974 where the issue was raised again in the Programme of Action on the Establishment of the New International Economic Order (NIEO)[18]. The subject is still being pursued by such UN agencies as UNCTAD, UNIDO and others.

Both the LDCs and the International Community's concern for the transfer of technology is deeply rooted in the former's underdeveloped nature. So that any discussion of technology transfer to the LDCs

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18. For further discussion see Laszlo and others (1978, pp 124-134), and Hart (1983, pp42-44).

must, in the main, relate to their underdevelopment and desire to eradicate poverty, and, in this way, meet their basic needs on a continuing basis. It is appropriate now to examine the concept of the transfer of technology with the hope of clarifying it and identifying the problems or issues most pivotal to it. In so doing we shall review some of the meanings ascribed to it by various writers and agencies.

The Transfer of Technology

UNCTAD which is the UN agency which has for a considerable period of time been involved in the study of issues related to the transfer of technology particularly from the DCs to LDCs defines transfer of technology as follows:

> Transfer of technology.... is the transfer of systematic knowledge for the manufacture of a product, for the application of a process or for the rendering of a service and does not extend to the transactions involving the mere sale or mere lease of goods (UNCTAD, 1983, 2).

This definition, clearly, excludes the sale of goods to or the import of goods by LDCs from the definition of technology transfer. However, it may not be entirely incorrect to state that the import of goods, despite its related constraints,[19] can be a useful conduit for transferring technology. For example, as an alternative to foreign direct investment, it may at least help the local infrastructure to develop indigenous expertise by emulation rather than importing expertise as part of the package. Another attractive aspect regarding this means of transfer is that product markets are more competitive and easier to survey.

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19. For a discussion on some of the constraints related to the sale or import of goods as a vehicle for transferring technology see Steele (1974).

Besides the explicit exclusion of the sale of goods, the UNCTAD definition is akin to other definitions of the transfer of technology given by various writers. Gruber and Marquis define the transfer of technology as "the utilization of an existing technique in an instance where it has not been previously used" (1969, pp255-256), so that technology transfer occurs when technology developed in one context is transmitted and used in another. Similarly, Gee defines the transfer of technology as "the application of technology to a new use or user". (1981, 18). To him it is a process by which, in addition to a particular purpose for which a given technology is developed, such technology is utilized either in a dissimilar application or by a new different user. Following the same approach, Chen defines the concept as "the introduction into a country of technologies which exist elsewhere but not yet in that country" (1983, 63). Though the approach is the same Chen confines the process to countries only and seems to exclude the transfer between different firms and industries within the same country. Finally, to Brooks, "Transfer of technology is the process by which science and technology are diffused throughout human activity. Wherever systematic rational knowledge developed by one group or institution is embodied in a way of doing things by other institutions or groups we have technology transfer." (1966, 54).

Inherent in all the above definitions is the development of new techniques or technology and its transfer and usage in either a new instance or environment. While we agree that a wider utilization of new techniques as implied by these definitions is essential, especially for those who lack the resources to develop such techniques to meet their needs, we do not fail to realise that these definitions have one major shortcoming. That is, they all fail to appreciate the major objective of technology, which is the fulfillment of needs. So

that for a transfer of technology to be successful and meaningful it must be able to satisfy the wants of its recipient on a continuing basis. It is possible to have a situation whereby the introduction of a new technology to another environment may not be able to fulfil the desired objectives which necessitated the transfer. And since technology is not transferred merely for its sake, its failure to realise the goals for which it is transferred will mean that the transfer has failed, which may be tantamount to saying there has not been any transfer.

Consequently, we shall understand the transfer of technology to mean the introduction of technology from one environment to another where its use is not only capable of meeting the needs of the recipient, but equally capable of imparting the necessary knowledge and skills for the continual satisfaction of these needs. It follows, therefore, that the technology transfer process is never complete until there has been the acquisition of the necessary skills by indigenous labour to manage and utilise the technology autonomously as well as its total absorption and diffusion throughout the recipient's entire industrial and agricultural sectors. It is only when this has been realised that the recipient country may be in a position to satisfy its needs on a continuing basis without depending much on either the original supplier or others.

Based on the earlier definitions several methods have been adopted to classify the technology transfer process. These include the classification developed by Brooks (1966) which distinguishes between "horizontal" and "vertical" transfers of technology (pp53-64). This distinction has been adopted by Mansfield (1975, pp372-376). Others include Cotton's "domestic" and "international" (discussed in Smith III, 1981, 11), and Bar-Zakey's (1974) "organised" and

"incidental" transfers of technology. As would be expected, these taxonomies of the technology transfer process do not relate to the underpinning considerations which prompt most countries, particularly the LDCs, to import foreign technology.

As stated earlier, most third world countries are underdeveloped and see industrialisation as a necessary element of any solution to this problem. Lacking the necessary technology and technical skills they consider their importation not only crucial in the development of their technological base but also as a spur to their industrialization efforts. So that for such countries the distinction of the technology transfer process into what I propose to call generative and consumptive may be useful. They stand to gain more by opting for what I call generative technology transfer rather than a consumptive transfer.

✓ A generative technology transfer is transfer which does not only enable the utilization of the transferred technology to satisfy human needs, but more importantly has the potential for the further generation of technology. The generative transfer process may include the transfer of hardware technology such as machines, implements, equipment and devices as well as software technology like technical and managerial experience. This type of technology transfer is crucial because the use of knowledge and tools to make tools for stated goals is the crux of the technology transfer process.

Consumptive technology transfer, on the other, refers to a transfer which cannot be applied to satisfy human present and future needs without the technology itself being consumed or exhausted, and, thus, may not have any real potential for generating any further technology. This transfer includes the transfer of consumer goods and some consumer durables which themselves are the embodiment of the technology that goes into their production.

It follows, therefore, that countries which desire a permanent technological base must, if possible, avoid consumptive technology transfer as much as possible and instead concentrate more on the generative transfer which by definition is organic. It must be stated here, however, that the mere choice of a generative transfer without the establishment of the relevant structures may not necessarily lead to any economic or development growth and the satisfaction of the needs of the importing country. It is also important that the technology acquisition is accompanied by the adoption of measures to reduce the extent of dependence on the supplier. Such measures may include upgrading the technical capabilities of the recipient country and executing its determination to generate its own domestic technology. For a generative technological transfer process to accomplish all this there must necessarily exist in the receiving country the requisite technical competence.

Technology Transfer and Indigenous Technological Capability

It may be necessary to point out here that the additional technology to be generated by generative technology should not be conceived in terms of only embodied or disembodied technology, but most importantly in the development of indigenous technological capability (I.T.C.) of the receiving country. This crucial aspect has, since the emergence of interest in the transfer of technology from the developed to the less developed countries, not been accorded significant attention by earlier studies. The latter tended to focus mainly on problems such as the "cost, suitability and effectiveness" of the transfer process. This point has been made by Fransman (1984a) who adds that an implicit assumption made by these earlier studies was

that LDCs possessed exceedingly weak technological capabilities and that the attention ought, therefore, to be on the inflow of foreign technologies, rather than on indigenous technological abilities. This assumption, however, as he points out, became subjected to challenge from the late 1970's "as the focus of attention shifted to an examination of technological processes and changes in these countries". (Fransman, 1984a, 5).

It has been suggested by Stewart and James (1982), on the contrary, that "there is not a single new focus but rather a new set of directions" (p.1), which are concerned with technology in a "dynamic" setting, concentrating on how technology changes over time, unlike previously when the main concern was the "static" use of choice out of a given set of techniques.

It would., however, appear that while there was some amount of interest in the question of indigenous technological capability before the 1970's,[20] it was not until the 1970s that significant empirical studies were undertaken in this area. Nevertheless, this is an encouraging development in the sense that it will create the necessary awareness for recipients of foreign technology, in addition to the development and strengthening of measures to minimise costs associated with such technology, to consider and develop the measures relevant to its employment in the development of indigenous technological capabilities and the learning processes that go with it.

Indigenous technological capability (I.T.C.) has been broadly defined to include (1) the ability to select from available

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20. An example of such studies is the 1964 UN study on the patent system and the transfer of technology to LDCs which, inter alia dealt with "the ability of the latter to adopt and use.... foreign technology in the implementation of their development programme" (see PP24 and 25).

technologies (Dahlman and Cortez 1982, referred to in Fransman 1984b, 303), (2) the ability to master imported technology (Westphal et al., 1981), and (3) the ability to introduce a degree of novelty in the production of products or processes (Fransman, 1984b). This can be amplified to mean the ability not only to select but select sensibly and "cost effectively" off-the-shelf technologies, the efficacious and efficient mastery of imported technology so as to carry out the necessary modifications for more meaningful indigenous application, and the successful channelling and diffusion of the adapted technology throughout both the agricultural and industrial sectors.

The ability to carry out changes to foreign technologies in order to adapt them to the different and peculiar circumstances or environment of the receiving LDCs appear to be the kernel of I.T.C. It seems to me, however, that it will not be entirely incorrect or inappropriate to stretch I.T.C. to cover the capability of LDCs, from the knowledge acquired through the utilization of foreign technology, to develop technologies peculiarly suited to their own environments. Consequently, we may disagree with Ranis (1984) when he suggests that it is "the capacity to make those changes continuously, rather than to invent something emerging full-blown 'from the brow of Zeus'", that constitutes the most relevant technological activity or capability (P.96). So that while I agree with Ranis that some foreign product technologies cannot be used without necessary modification or that there does not seem to be much sense re-inventing existing technologies, I would argue that the ability to utilize acquired knowledge to develop relevant technologies to meet the needs of LDCs, is a worthwhile exercise. We will, therefore, understand I.T.C. to include not only the eclectic selection from the international technology shelf, the ability to master and adapt foreign technology,

but also the ability to diffuse such technology throughout the entire indigenous industrial and agricultural sectors as well as utilize knowledge acquired from the imported technology to develop both product and process technologies to meet the needs of the people irrespective of the simple nature of such local technologies.

The development of I.T.C., it is instructive to note, cannot be accomplished solely by the mere importation of foreign technology. This needs to be matched with the availability of certain factors in the importing country. These include the availability of high quality human resources, a crucial aspect of indigenous capacity, and the appropriate organisational/institutional infrastructure to back up the learning process.[21] There is a third growing significant consideration, which is government intervention policy to protect the initial learning process.

There is now a strong opinion (see below), despite the presence of isolated dissenting voices, for the need to protect learning process and the development of I.T.C. Among these dissenting voices is Dore (1984) who in referring to Indian manufacturing firms believes that the high level of protection enjoyed by Indian firms is one of the reasons for the low level of productivity and technological incompetence in many but by no means in all these firms.[22] The need

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21. For an interesting discussion of this see Ranis (1984, ppl01-106).

22. As another example of such dissenting voices, Fransman refers to Ranis and others at the Yale Economic Growth Centre who hypothesize in a study that tariffs protection depresses the level of inventive activity and that the net effect of increased competition is to stimulate innovation. (Fransman, 1982, footnote no. 9).

to protect I.T.C. results from the recognition of the effects of international competitive pressure, especially from multinational firms, which does render the unpredictable learning process unattractive or which in some cases might be so enormous as to prevent local firms from engaging in activities designed to strengthen technological capabilities.

In addition to this strong opinion, there is, in actual fact, an increasing amount of evidence to suggest that learning and the improvement of technological capabilities have successfully taken place under conditions of protection (Lall, 1982, and 1984; Katz 1984; Dahlman, 1984; Westphal, 1981 and Westphal et al., 1981, 1984). Even Fransman's study of near-free-trade Hong Kong, while it demonstrates some merits associated with the near-free-trade regime, confirms that such a regime prevents the production of certain goods and services and thus impedes the attendant learning processes and technological change (Fransman, 1984b and 1982). Consequently, he also believes that "direct government intervention" is necessary to promote "qualitative jump" in I.T.C. (Fransman, 1984b, 313). This should, however, not be carried to the extent that it renders local industries dormant, incompetent and lag unnecessarily behind the international frontiers. It may also be pointed out here that the fact that I.T.C. proves successful under protection does not mean that the benefits or merits of protection necessarily outweigh the costs even in those cases where protection works. Needless to add, the enhancement of I.T.C. may not necessarily take place under very condition of protection.

Condition for the Protection of I.T.C.

While technological change and the learning process that go with it are acknowledged as being crucial, and thus, the need to be protected, little is yet known of the conditions required to promote their emergence and consolidation. Nevertheless, there is a rather wide consensus on the significance of the development of a local capital goods sector (Fransman (1984b), Rosenberg (1976), Dahlman and Westphal (1981) referred to in Fransman (1984b). This sector, is generally agreed, "lies at the heart of processes involving the generation and diffusion of technological change" (Fransman, 1984b 303) and therefore makes a case for state intervention and assistance in its local promotion. Rosenberg makes almost the same point to the effect that all innovations require that the capital goods sector in turn produces new products (capital goods) according to certain specifications (Rosenberg, 10-11). Similarly, Dahlman and Westphal suggest that without some degree of local mastery in the embodiment of technology in capital goods the achievement of socially warranted adaptation will not be possible (Referred to in Fransman 1984b, 304). It appears, therefore, that a case for protection of machine production and other capital goods will seem quite reasonable.

In addition, Katz in his study of Latin America metal-working industries, (1984, 113-136) has hinted that protection of infant learning may be appropriate in cases where domestic markets are sufficiently large to permit internationally sufficient scales of operation, and secondly, where the world's technological frontier does not experience very dramatic jumps over time, thus permitting a gradual narrowing of the relative gap that separates developed

countries and LDCs from international technical standards. He points out that under such conditions a public policy of protection systematically maintained over several decades, seems to have successfully induced the development of highly competitive national enterprises based on a solid local technological foundation.

Two main issues are raised by Katz's hints. It is deducible from his analysis that where the market size is not as big as or close to the Brazilian then protection may not be appropriate. Since many LDCs do not have a market as large as the Brazilian it may be argued quite logically that Katz's conclusion relating to market size may not be very relevant to them.

Secondly, if on the contrary, the world's technological frontier experiences dramatic jumps leading to the constant disappearance of mature products then to follow the frontier LDCs may well require a different or new set of technological skills. This may complicate the issue of protection, particularly its duration. As Katz himself asked, "should society take upon itself to protect a second or even a third round of indigenous learning in order to prevent the technological gap from widening once again, or should the returns from the first learning sequence finance the dynamics of the evolving process?" (P.132) All this will seem to weaken the case for protection, especially if it is geared mainly to the reduction of the technological gap.

However, in the case of mature products for which there are not perfect substitutes and for which there is enough demand a local firm could continue to exploit its accomplished technical learning even within the framework of a matured product even if the international technological frontier experiences dramatic jumps (Katz, 1984, 131).

In spite of all these hints it still appears difficult to formulate any general public policy in the area of protection. Consequently, Katz suggests that 'tailor-made' policy action that would closely reflects "the specificity of the learning situation of each particular form of production organisation" will seem necessary (P.135). In the same vein Westphal argues for selective protection (1981, 31-35).

I.T.C. and the Patent System

Paradoxically, the development of the patent system which was intimately related to the promotion of domestic development of inventions or technologies and their exploitation now serves as a "scarecrow" to the development of I.T.C., especially in the LDCs (see above). Patent grants are increasingly being used by inventors not only to ward off competitors but equally importantly to block any potential indigenous "intruders" in their respective fields. This may not only result in creating industrial monopoly, but it also adversely affects the development of I.T.C. in such fields. This necessarily ordains government intervention for the successful development of I.T.C. While other measures have been used by governments in this direction the patent system which was basically conceived to stimulate indigenous technological development has not been effectively used in this respect.

Government intervention in respect of I.T.C. has been conducted through import controls of consumer as well as intermediate and capital goods especially those of which local production exist. It will appear, however, that a more effective barrier for the protection of I.T.C. can be built through the mechanisms of the patent system and

licensing requirement. Out of the two, the licensing requirement is now increasingly being used by a number of LDCs to discourage the payment for the use of technology from abroad when similar or equivalent indigenous technology already exist. It is instructive to note that the control through licensing, besides its effect on the balance of payment position of the country using it, is an important form of protectionism. It provides protection from technological competiveness necessary to nurture LDCs' I.T.C.

Similarly, it may be hypothesized that the patent system can be efficaciously employed to nurture the development of I.T.C. and thus promote the goals for which it was developed. It will be appropriate in this respect for LDCs to examine more carefully their policies on patentability not only in terms of their economic development goals, but also in relation to the development of I.T.C. For the successful use of the patent system in this way there may have to be in existence a technology policy which must not only encompass it but which, in turn, must also be integrated into the national development plan. This, it will be argued, will ensure the use of both the patent system and the technology policy as tools for economic development, and, in particular, enable the former to contribute meaningfully to the development of I.T.C.

I.T.C. and the Technological Gap

An interesting issue of the ongoing development of indigenous technological capabilities in the LDCs is the increasing attainment of technical sophistication by local manufacturing enterprises as well as their growing international competitiveness.

This LDC economic progress, particularly in respect of manufactured exports and the closing of the technological gap between DCs and LDCs, according to Kaplinsky, was a phenomenon of the "expansionary upswing" which passed through its peak in 1971-1973. (1984, 139-160 of 41). And as the world economy becomes engulfedin the "downswing", LDC export-led growth is threatened with the introduction and diffusion of microelectronics to DC industry. This, he believes, has the consequence of re-opening the technology gap. The widening of this gap results from the substantial gains derivable from this introduction of electronics and its uneven diffusion in the world economy as well as the emergence of automation technologies which are dependent upon the widespread of electronics in a series of separate activities. Kaplinsky uses Computer-Aided-Design (CAD) to demonstrate this and to refer to the increase in the pace of DCs technological change as well as the increasing inappropriateness of emerging DC technologies for LDCs.

In further illustration of this waning competiveness of LDC producers and the growing narrowing of DC markets to the latter, Kaplinsky refers to his sugar industry study and points out that while Indian Vacuum Pan Plant manufacturers actively compete with DC suppliers in supplying similar equipment to other LDCs, there have been no cases of the former supplying plants to DC markets. This is because, in addition to the fact that DC sugar producers generally process beet rather than cane, the Indian suppliers are unable to meet the demand for the automated processing systems used in DC economies. Furthermore, the unattractiveness of some LDC products is exemplified by the brownish sugar with inconsistently sized granule produced by the open pan-sulphitation technology which is peculiarly suited to most LDCs.

All this indicates that, in the microelectronic era, third world technological capability is increasingly becoming inappropriate for DCs, and, in addition, produces products unacceptable for DC consumers. Kaplinsky's analysis, however, should not be stretched too far so as to ignore the occasional significant penetration of DCs market by some LDCs even in high technology areas. The recent selection by the British Ministry of Defence, among four contenders,[24] of the Tucano aircraft designed in Brazil but to be built by Short Brothers of Belfast for the next basic trainer for the Royal Air Force is a case in point ("The Times", Fri. March 22, 1985, ppl and 4). Though the choice of this aircraft has been criticised by opponents that it was a "pay-off" to Brazil for its help to the British government during the Falklands Campaign in 1982, it does not, nevertheless, question the technical competence of the aircraft. It may also be correct to state that in other technological fields where the world frontier does not experience very dramatic jumps LDCs may still be able to compete with DCs.

Nevertheless, the move of DC technology away from batch to continuous production renders it less appropriate for LDCs, while the growth of LDC technology is particularly relevant to other LDCs. The resultant effect will seem to be a growth in technology trade between LDCs, with an accompanying decline in the share of this trade between DCs and LDCs. This, therefore, makes it imperative for LDCs to expunge the rigidities and major structural differences in their

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24. The other contenders for the contract were British Aerospace with the Swiss Pilatus PC9 aircraft, Hunting Firecracker with British designed aircraft, and Westland Yeovil with an Australian aircraft.

technology-related laws, such as patent and licensing legislation, so as to facilitate technology trade and dissemination of new technical knowledge among themselves. For example, the present patent law of Ghana, which will be discussed in Chapters Four and Five, makes it difficult not only for Ghanaians to obtain a patent but equally so for other LDC inventors, and therefore, needs to be reviewed. All this will make available to them not only appropriate technologies, but also appropriate products relevant in meeting their needs.

Conclusion

So far we have tried to clarify the concept of technology, examined the legal nature and economic functions of patents, as well as the technology transfer process, and have endeavoured to relate them to the question of human needs. We have also emphasized the need to utilize acquired technology to enhance the development of indigenous technical competence. Since the satisfaction of needs is a continuing process the acquisition of the necessary skills to meet one's needs becomes paramount. Finally, we have also mentioned the need for LDCs to co-operate in the field of technology since the DCs technology is beginning to be more and more inappropriate for the former. This, we believe, will serve to provide the requisite technology and products to satisfy LDCs' need which DC technology cannot meet without its concomittant costs and problems. Having said so we shall proceed to examine the international patent system and some international, regional and national policies and efforts concerning the patent system as well as the transfer of technology.

CHAPTER 2

THE INTERNATIONAL PATENT SYSTEM AND THE DEVELOPMENT AND TRANSFER OF TECHNOLOGY

Historical Development

The patent system as a reward mechanism for the development of new technologies took shape as early as the 15th Century, though "numerous examples" of privileges granted to innovators occurred during the 14th Century (Gomme, 1946, pp5-13).

The "systematic use of monopoly privileges for inventors" as a spur for inventive activity emerged in Venice in the 15th Century (Ibid.). This spread to other parts of Europe, and by the 16th Century patents were widely used in Germany by some German princes and in England by the Crown to encourage invention and the introduction of new arts. The abuse that came to be associated with these grants of special rights, particularly in the latter, were so pronounced that it eventually culminated in the enactment of the Statute of Monopolies of 1623. Though this essentially aimed at curbing the increasing abuses by the Stuarts in the grant of monopolies, it served as the springboard of Anglo-Saxon patent law.

The Statute of Monopolies declared all monopolies void under the common law except:

> .... any letters patent and grants of privileges for the term of fourteen years or under, hereafter to be made, of the sole working or making of any manner of new manufactures within this realm, to the true and first inventor of such manufactures which others at the time of making such letters patent and grants shall not use... (S.6).

This provision in particular and the statute in general have been acknowledged to be the "first general law of a modern state to lay down the principle that only the 'first and true inventor' of a new manufacture should be granted a monopoly patent" (Penrose, 1951, 7). It is instructive to note that the "first and true inventor" was given a much broader meaning under the earlier patent systems, and thus encompassed the first persons to introduce a new art from abroad (See Davies, 1932, pp397-398).

The enactment of similar laws to encourage invention and development of industries subsequently spread to other countries. The latter part of the 18th Century witnessed countries such as the U.S. and France promulgating their own laws. It was not until the 19th Century that more countries adopted a patent system. During the latter part of the century, however, the patent system came under attack in some countries of Europe. This attack and the controversy surrounding the system eventuated in the repeal of the Netherlands law on patent in 1869 which was subsequently reintroduced in 1912. Similarly, this controversy also raged fiercely in Switzerland.

Nevertheless, by the close of the 19th Century almost all the present industrialised countries had promulgated patent laws (UNCTAD, 1975a, Para 232). With this development there arose the need amongst these countries to devise minimum rules on patents. It was this need which eventually resulted in the Paris Convention.

Prior to the approval of the Paris Convention in 1883 and its coming into force on the 7th of July 1884 there was no multilateral mechanism for industrial property protection. The rights of a foreign inventor to protection in the field of industrial property were,

therefore, dependent essentially on reciprocity between the laws of his own country and those of the country in which he desired or wished to obtain protection. In effect, there was no formalised standardised mechanism by which inventors could register their inventions in foreign countries so as to acquire the monopoly rights they desired across their national frontiers. The need for an international patent system consequently became imperative for a number of reasons. These include (a) the then unsatisfactory situation occasioned by the numerous fundamental differences between the patent laws of different countries and the attendant disadvantage at which foreign inventors were placed and (b) the increasing importance of international trade and investment to the economies of the major industrialised countries.

As would be expected, the United States and England, then great industrial powers played a very prominent role in the development of an international patent regime for the protection of the rights of inventors. In fact, it was the initiative of the U.S., and not the host country, Austria, which resulted in the Congress of Vienna (1873) which was the first international effort to harmonise the world patent systems (See Nanyenya-Takirambudde, 1980). This congress was restricted to patent matters and concentrated on the modes of accomplishing an uniform international patent system as opposed to the means of reducing diversity in national systems.

The Vienna Congress was followed by the 1878 Paris Congress on industrial property. The latter was not confined to patents but also covered trademarks, designs and models. The general goal, however, was still the attainment of uniformity or minimum unification of the diverse world patent system. To realise this a permanent international commission was appointed to draw up legislation.

The subsequent and final international conference on patents which still serves as the basis for the present international patent system is the 1880 Paris Conference. This congress departed from the concept of uniform legislation as advocated by the two previous congresses. Instead, it favoured the formulation of a number of provisions to be included in an international convention to enable minimum divergence in national patent systems. It adopted a draft convention which was subsequently ratified at the 1883 International Conference which was also held in Paris. The convention came into effect on the 7th July 1884 following the approval of the draft convention and the exchange of the instruments of ratification.

It is interesting to note that at the 1878 conference it was agreed that the then metropolitan countries should extend their patent laws and systems to the colonies (Penrose, 1951, 53). This was in fact done in most of the colonies, some of which still operate colonial patent systems. Consequently, the colonies which were neither participants in the various conferences nor signatories to the convention were also affected by it. On the attainment of independence a number of them formally acceded to the Convention and their participation has now taken a different dimension. It is their uneasiness with and stand against what I consider to be the rock (i.e. the essential provisions) of the Convention, which we shall discuss shortly, which has set in motion the current diplomatic revision of the Paris Convention which has already been revised six times, the last revision being at Stockholm in 1967. Unless otherwise explicitly mentioned all references in this work are to the latest revised text.

Main Features and Provision of the Convention

Among the major patent provisions of the Paris convention are Article 2 which establishes the principle of "national treatment", Article 4 which provides for the concept of "priority" and Article 5 which deals with compulsory licensing and imports of patented products.

National Treatment (Article 2)

Article 2(1) which provides for equal treatment for all patent applicants and owners by member countries of the Convention stipulates:

> Nationals of each of the countries of the Union shall, as regards the protection of industrial property, enjoy in all the other countries of the Union the advantages that their respective laws now grant, or may hereafter grant, to nationals, without prejudice to the rights specially provided by the present Convention. Consequently, they shall have the same protection as the latter, and the same legal remedy against any infringement of their rights, provided they observe the conditions and formalities imposed upon nationals.

The essence of this provision is to disallow member countries from discriminating between patent applicants and owners of different nationalities. So that a member country, no matter the level of underdevelopment and scientific and technological capability, cannot discriminate in favour of its nationals as a means of encouraging indigenous inventiveness and initiative.

By virtue of the principle of national treatment foreigners and nationals are equal before the patent jurisdiction of a granting member country subject to exceptions provided under Section 3 of Article 2[1]. Consequently reciprocity, which implies the conferral of reciprocal rights by member countries on their nationals and which was unambiguously rejected when the principle of national treatment was included in the original text of 1880, cannot be demanded by any member of the Union. In addition, the rejection of the concept of reciprocity means that countries which do not have a patent law can adhere to the Convention and nationals thereof obtain equal treatment with nationals of other convention countries although the latter will not have any patent rights in the former countries, (See Penrose, 1951, 64-65).

Formal equality as provided for by Article 2 would operate to the mutual advantage of the convention countries if they were either at or almost at the same level of technological and economic development. However, with the present immense diversity in technological capabilities between the developed and the less developed member countries,the principle simply confers on the more developed members unlimited rights to the detriment of the other.

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1. Article 2(3) provides that "The provisions of the laws of each of the countries of the Union relating to judicial and administrative procedure and to jurisdiction, and to the election of domicile or the designation of an agent, which may be required by the laws on industrial property, are expressly reserved".

The provision, therefore, does not appear to be fair, in so far as it mandates similar treatment for two unequals, that is, the advanced industrialised countries and their MNCs and the LDCs and their lone inventors. The need to protect and to encourage inventive activities of the two is obviously not alike. Logically, the provision to protect and encourage must, correspondingly, be distinct to each of them because the assumption underlying the article that there would be mutual benefits in the form of an exchange of patents and licences between members of the Union does not, especially with the membership of the LDCs, hold any longer.

Any dissimilar treatment for DCs and LDCs members may seem to affect the main objective of the Paris Convention - non-discrimination between patent holders - it will, nevertheless, be in accord with existing practices in international trade whereby developed and developing countries institute dissimilar measures regarding economic activities of foreigners and nationals (See UNCTAD, 1977a, Paras 19 and 20; and Vaitsos, 1976, 90). The institution of similar discriminatory measure in respect of patents may be confronted with practical issues such as the legal personality of subsidiaries of MNCs which may enable the registration of an invention in the name of the subsidiary, possible retaliatory measures in the area of trade (Vaitsos, op. cit., 90) and the blockade of investment and the flow of technology.

As a way out Penrose (1951) has proposed an alternative strategy which has received the endorsement of UNCTAD (1977a, para 83) and writers such as Vaitsos (ibid) and Hamza (1984, 133-134). After having stated quite rightly that under present arrangements foreigners cannot be discriminated against by members of the Union and be made to suffer by the imposition on them of special restriction, she went on further to propose, however, that:

> ..... because the patents owned by foreigners are characteristically patents on inventions worked abroad, a de facto discrimination can be effected by the application of special limitations on patents that are primarily worked in other countries. This method of dealing with foreign patents neither violates the International Convention nor necessarily exerts an uneconomic influence on the location of industry, but it reduces the costs to an economy of granting foreign patents (P.169).

This strategy essentially involves altering the basis of concern and status for protection from the owner of a patent to the geographical origin of the patent. By this both foreigners and nationals would, supposedly, be offered the same treatment, thus not infringing the national treatment principle. Yet patents on inventions developed locally by either nationals or foreigners could be treated differently from patents on foreign inventions or inventions worked abroad but developed locally. How this is to be accomplished is not explained.

While I agree with Penrose that the above strategy may possibly have the merit of minimising the costs to the economy of a country granting foreign patents, I will argue that the proposed discrimination based on the geographical origin of an invention rather than the nationality of an inventor will violate the letter and spirit of Article 2(1) since every invention is traceable to an inventor a foreign invention may, thus be traced to a foreign inventor. Similarly, inventions worked abroad could also be traced to either foreigners or nationals. So that by treating local inventions more favourably than foreign inventions countries would thus be

discriminating against foreign nationals who are the creators of such foreign inventions. This, therefore, will amount to what Ladas has referred to, and is endorsed by Penrose herself, as a "circuitous" method of violating the Convention when he was examining the question as to whether imports of patented products could be impeded by heavy fines or custom duties (See Penrose, 1951, 76 and 77).

It will appear, therefore, that Penrose's strategy may, necessarily, involve the entire revision of Article 2(1) to enable the LDCs to practise positive discrimination in favour of true indigenous inventions. Such positive discrimination may also be extended to subsidiaries of MNCs engaged in genuine inventive activity. This should not create any difficulties in principle or practice.[2] After all in international economic law there is now an increasing acceptance of "reverse preferences". Until this is done it would be difficult for LDCs to encourage local inventive and R & D activities effectively by giving local inventors the much needed shelter without violating the letter and spirit of Article 2(1).

Right of Priority (Article 4)

Another major provision of the Paris Convention is Article 4 which establishes the principle of priority. Article 4(A)(1) states:

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2. UNCTAD takes a similar stand (1977a, para 82). Vaitsos (1976) however, believes it may not only be very difficult, but even impossible to revise this article.

> A person who has duly filed an application for a patent, or for the registration of a utility model, or of an industrial design, or of a trademark, in one of the countries of the Union, or his successors in title, shall enjoy, for the purpose of filing in the other countries, a right of priority during the periods hereinafter stated.

In the case of patents the priority period provided for by Article 4(C)(1) is twelve months. The principle of priority entitles any inventor who has duly filed an application for a patent in a convention country to have a priority of 12 months within which to file similar applications in other convention countries. It is interesting to note that the initial priority period provided by the 1883 Convention, at a time when the means of communication was not as efficient as today, was 6 months as opposed to the current 12 months (see Article 4 of the 1883 Convention).

The principle of priority further provides that priority rights, are maintained under conditions of regular national filing (Article 4 (A)(2)). This is defined as "any filing that is adequate to establish the date on which the application was filed in the country concerned, whatever may be the outcome of the application" (Article 4(a)(3)). It is clear, therefore, that the eventual fate of the patent application, that is, whether it is refused or not, does not prejudice the right of priority. This, as observed by one UNCTAD report, creates ".... the somewhat paradoxical situation that, although the priority right itself is concerned with temporal unification, the actual implementation distinguishes between the right of priority and the final fate of the patent application". (1977a, para 59).

The priority principle benefits mainly the patent applicants. It protects them from the loss of novelty that would occur in instances of non-concurrent application in countries which insist on absolute rather than relative criteria of novelty. Article 4(B) specifically establishes that the novelty of an invention will not be disturbed by reason of any act done in the course of the priority period. Consequently, the publication or working of an invention by anyone during that period will have no consequence on subsequent applications in other member countries provided they are filed during the priority period. It must also be noted that Article 4(F) enables the sequential extension of the priority period with regard to elements of the invention not included in previous applications.

An overview of Article 4 points to the conclusion that it is concerned more with the interest of patent applicants than the public interest as affected by patents. For the LDCs the effects of Article 4 may constitute a strong disincentive to initiate research and development activities because of the cost a priority claim could have on time and money invested in such activities. Similarly, it could also affect the utilization of new inventions by indigenous enterprises since a priority right could be invoked at any time during the priority period. It is interesting to note that some LDCs, including Nigeria, have confronted this problem quite boldly. Nigeria has succeeded in this respect by the inclusion in its patent law of Section 6(4) which forestalls the situation whereby an indigenous inventor could be prevented by a priority claim from exploiting his invention (See Chapter 6). A similar line of action by the LDCs may reduce the negative effects of Article 4 of the Convention on their R & D activities.

Independence of Patents (Article 4 bis)

The article which together with Article 4 unduly increases the privileges, in terms of duration, of a patent based on priority is Article 4 bis (See particularly Article 4 bis (5)). This article which was agreed upon and adopted at the 1900 Brussels revision conference establishes the independence of patents obtained from the same invention in different countries. The main provision of Article 4 bis (1) provides that:

> Patents applied in the various countries of the Union by persons entitled to the benefits of the Union shall be independent of patents obtained for the same invention in other countries, whether members of the Union or not.

Section 2 of the article goes on to add further that:

> This provision is to be understood in an unrestricted sense, in particular, in the sense that patents applied for during the period of priority are independent, both as regards the grounds for invalidation and for forfeiture and as regards their normal duration.

The independence of patents established by the article is, to some extent, the result of the sovereignty of countries which implies that they are free to decide on issues such as patentability and other matters relating to patents generally.

By virtue of this article patent applications which have been rejected, or, where granted, patents which have been nullified in one member country or even in the country of prior grant on the grounds of lack of patentability could still be granted or valid respectively in

other countries if they do not take similar actions to reject or determine them. For example, in early 1970 the U.S. Justice Department requested and procured the cancellation of what it deemed to be "fraudulently procured" ampicillin patent and the invalidation of ampicillin trihydurate patents. Meanwhile, patents for ampicillin had been taken out in more than 60 countries and even in 1968 the world-wide sales by one company alone and its licensees were about $170 million (See Vaitsos 1976, 94 and 95; and UNCTAD, 1977a, para. 68). In spite of the U.S. action other countries continued to grant monopoly privileges to the "fraudulently procurred" patents. This "fraud" on most countries including the LDCs which suffer from a dearth of skilled personnel is likely to continue for so long as Article 4 bis remains unaltered and the LDCs themselves are not able to undertake a meaningful screening and monitoring exercise in respect of foreign patents. The setting up of a mechanism for the exchange of information on forfeiture proceedings between the Convention member countries will therefore be useful. In this respect, the Patent Cooperation Treaty (PCT) could be beneficial to a number of LDCs.

Moreover, if developing countries were to incorporate into their patent laws a provision requiring applicants for patent grants to submit to the competent authority the result of earlier applications in other countries, in particular, the result of the first application they may be able to reduce the cost involved in granting foreign patents. Such a provision is available under Brazilian patent law (Article 20, Law 5722, 1971). It would also be useful if countries in which the application was made were obliged to inform the others about the results of its examination.

Article 4 bis apparently seems to depart from the concept of "internationalism" of patent sought by the Paris Convention. It is, nevertheless, in complete harmony with the overall philosophy of the Convention to protect the interest of patentees.

Compulsory Licensing (Article 5)

Though most LDCs which grant patents for inventions are most concerned that such inventions are exploited, only a small proportion are directly worked in these countries (UNCTAD, 1975a, paras 273-280). To deal with this problem of non-working as well as other abuses of the patent grant, the Paris Convention provides for the device of compulsory licensing. Article 5(A)(2) of the Convention whose present provisions were agreed upon and adopted at the 1958 Lisbon revision conference states:

> Each country of the Union shall have the right to take legislative measures providing for the grant of compulsory licences to prevent the abuses which might result from the exclusive rights conferred by the patent, for example, failure to work.[3]

Though compulsory licensing procedure is conceived to be the major instrument for non-working of patents, as one UNCTAD report has demonstrated, it has in practice proved to be virtually of no value, (1975a), paras. 335-340) for a number of reasons.

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3. Compare this provision with the previous Article 5(a)(2) which merely provided that "Nevertheless each of the countries shall have the right to take the necessary legislative measures to prevent the abuses which might result from the exercise of the exclusive rights conferred by the patent, for example, failure to work".

One of such factors is the provision of Article 5(A)(4) which states:

> An application for compulsory licence may not be made on the ground of failure to work or insufficient working before the expiration of a period of four years from the date of filing of the patent application or three years from the date of the grant of the patent, which period last expires; it shall be refused if the patentee justifies his inaction by legitimate reasons. Such a compulsory licence shall be non-exclusive and shall not be transferable, even in the form of the grant of a sub-licence, except with that part of the enterprise or goodwill using such licence.

The strict application of this provision is likely to prolong the time lag to obtain a compulsory licence more than the periods indicated. This may be so especially in cases where prior examination as to substance is required before a grant, and also where the application for a licence is to be determined by the judicial rather than the administrative branch as recommended by the BIRPI Model Law for developing countries (See Section 44).[4] This has in fact, been adopted by Nigeria, (see Schedule 1, Part 1, Patents and Designs Decree, 1970) and it is still continued despite the fact that the BIRPI Model Law on this issue has been revised by the WIPO Model Law which proposes the patent office to be the authority competent to

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4. Some LDCs have adopted it (See UNCTAD, 1975, para 339). However, Brazil, India, Israel, Mexico and Peru have recognised administrative jurisdiction on this matter.

grant compulsory or non-voluntary licence (See S.148). Furthermore, the option of MNCs to grant the first compulsory licence to any of their subsidiaries could widen the time lag (Vaitsos, 1976, 91; and UNCTAD 1977a, para. 35). This may mean further delays before any decision to grant a second licence could be made. Consequently, the usefulness of a compulsory licence even if obtained eventually would be considerably diminished as compared with what it would have been in the absence of such delays. The abuses would have continued for a longer period of time, and the patent would not only be close to the end of its life span but the invention or the technology itself would have become obsolete.

A significant aspect of article 5(A)(4) which is endorsed by paragraph 2 of Section 34 of the BIRPI Model Law and again adopted by Nigeria (S.4 Sch. 1, Part 1) and other LDCs relates to the provision that a compulsory licence should be refused if a patentee justifies his inaction by "legitimate reasons". The concept of "legitimate reasons" or "justifiable" actions is unclear and its interpretation would largely be dependent on the will of the authorities concerned. The notion of "force majeure" has been suggested to be appropriate in the circumstances (see UNCTAD 1977a, para 31). This may find favour with both developed and developing countries since it is generally accepted in international legal transactions.

It is interesting to note that the BIRPI Model Law (S.43 (2)) goes further to propose the possible cancellation of a non-voluntary licence if the state of affairs which initially justified its grant has ceased to exist. This is merely a recommendation and may not have much significance if not adopted. However, if it should be adopted, as Nigeria (s.1Ø, Sch. 1, Pt. 1) and other LDCs have done, then, besides the creation of an unavoidable uncertainty in the patent

system of the adopting country, it will also lead to unnecessary cost and inconvenience to licencees who would invest capital to exploit the invention and later have the licence withdrawn.

Table 2:2

Number of Compulsory Licences Granted in Selected Countries

Countries	Period Covered	No. of applications for Compulsory Licence			
		Filed	Refused	Abandoned	Granted
LDCS					
Ghana	1900-1984	None	-	-	None
Nigeria	1900-1984	None	-	-	None
Morocco	1958-1963	None	-	-	None
Cuba	1958-1963	None	-	-	None
India		4	-	-	1
Philippines		8			None
Rep. of Korea		1			1
DCs					
U.K.	1959-1968	57	-	-	6
Canada	1935-1970	192	14	72	79
Switzerland	1952-1963	None	-	-	None
Japan	1958-1963	None	-	-	None
Denmark	1953-1970	7	-	1	3
Poland	1958-1963	7	-	-	None

SOURCES: 1. Registrar-General's Department, Accra, Ghana.

2. Patent and Trademarks office, Min. of Trade & Commerce, Lagos, Nigeria; and

3. UNCTAD, 1975a, p.50.

Even when it is possible to obtain a compulsory licence within a reasonable time period and without any apprehension of a subsequent cancellation it is doubtful whether local licensees would be able to work the patented invention successfully without the necessary know-how. Unless the disclosure of the invention is really adequate and sufficient, and the licensee possesses the requisite technical skills the prospects of a successful working on the basis of the compulsory licence are bleak. All these including the non-exclusive grant of the compulsory licence[5] do render this licence as a very unattractive and ineffective patent abuse-checking mechanism. As Table 1 illustrates compulsory licence is neither popularly used nor easily available to the applicant in both the developed and developing countries.

From the table it is very clear that the use of compulsory licensing in the LDCs is almost non-existent. This may create the wrong impression that abuses of patent grant or non-working do not occur in these countries. This is also true of some developed countries. Canada seems to be an exception, and even here the total grant of licences is not very impressive. The grants represent an average of "2.3 licences per year or only Ø.Ø1 per cent of the average grant of patents in one year". A significant factor contributing to the high number of the grant of licence is the change of the patent law in 1969 which permitted compulsory licences for medicines to be granted either for manufacture or importation (UNCTAD, 1975a, para. 337).

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5. Some countries including Peru grant exclusive compulsory licences.

In spite of the inefficiency of compulsory licences, forfeiture or revocation which may be more effective in dealing with patent abuses are, according to Article 5(A)(3), not available until after a further two years from the first compulsory licence. This implies that abuse of a patent privilege by a patentee can continue for a long period before it can be effectively checked.

Imports (5A1 and 5 Quater)

One other provision which touches directly on the interest of the LDCs is Article 5A(1) which permits importation by patentees without losing their monopoly privilege. The working of patents in developing countries is of paramount importance to their economic development, and it might have contributed to inducing their participation in the international patent system. Their stand against imports is so strong that they do not recognise them as conduits of technology transfer, though I have already indicated the usefulness, in some cases, of imports as technology transfer mechanism and Greif (1981 and 1982) has also painstakingly endeavoured to demonstrate this. To these countries the working of patents cannot be substituted for the importation of patented products. Nevertheless, the Convention by article 5(A)(1) has provided quite explicitly that:

> The importation by the patentee into the country where the patent has been granted of articles manufactured in any of the countries of the Union shall not entail forfeiture of the patent.

This article which was aimed essentially at the then French law which provided for forfeiture for the importation of a patented product by

patentee (Penrose, 1951, 75) also owes its place in the Convention to the "inexcusable interpretation" of the French word "exploiter" by Senator Bozerian, the Chairman of the 1880 Paris Conference. He misconstrued the word "exploiter" (to work) which appeared in the text of the Convention to include "vendre" (to sell) (ibid). This interpretation as Penrose rightly points out "was completely wrong in both the legal and popular usage" (ibid).

Nevertheless, Article 5(A)(1) has survived many revisions of the Paris Convention and is held dear by patentees. To ascertain the effect of this article it must be analysed in the context of Article 5 as a whole. The effect of Article 5(A)(1), as we have already observed, is the creation of import monopoly. It may be noted that some LDCs have taken steps either to erode this monopoly as exemplified by the Nigerian law (Schedule 1, Part II) or to deprive the patent holder of import monopoly right as under Mexican and Andean pact legislation (see below).

A second element of the import monopoly issue rests on Article 5 quater. This article stipulates:

> When a product is imported into a country of the Union where there exists a patent protecting a process of manufacture of the said product, the patentee shall have all the rights, with regard to the imported product, as are accorded to him by the domestic law of the country of importation, on the basis of the process patent, with respect to products manufactured in that country.

This article which was introduced into the Convention at the Lisbon revision conference in 1958 is of immense significance to products,

such as chemicals and pharmaceuticals where the control of production processes is very important. Not surprisingly, it has been suggested that the chemical and pharmaceutical industries might have promoted its introduction (Vaitsos, 1976, 93).

The article is applicable only to countries of the Union which recognise the grant of patent monopoly to "a process of manufacture". It must also be noted that Article 5 quater is applicable when the protection furnished by the process patent is extended to products manufactured by the use of that process. This practice has been suggested by the BIRPI Model Law, and Nigeria by virtue of S.6(1)(b) of its 1970 Patent Decree has adopted it. This is also true of some other LDCs.

By virtue of Article 5 quater importation of a product the production process of which is patented by any party without the licence of the patentee constitutes an infringement whether there is in existence any local production in the importing country or not. Referring to this article one UNCTAD report commented thus:

> This is one article in the Paris Convention that per se provides for a privilege of the patentee. Control over process is enough to give the import monopoly and thereby control the domestic market in the patent granting country (provided, as is almost always the case in developing countries that the privileges of the patentee include sale and use), (1977a, p.53).

Article 5 quater obviously conflicts with any endeavour to expunge the exclusive right of importation on products manufactured abroad by a patented process. In addition, since in practical terms most of the patents are not exploited within the territories of developing countries, the article entails the acceptance of the import monopoly

if sale and use privileges are present, as it is almost always the case, in their national legislation. Clearly, developing countries do not derive any merit from the sustenance of this provision and the exclusion of it may be a reasonable target in the ongoing diplomatic revision of the Convention.

As a result of all these negative effects of the above provisions it has been concluded that the LDCs do not derive any significant benefit from the international patent system.[6] (Grundman, 1970; Vaitsos, 1972; Penrose 1973; Greer, 1973; and UNCTAD, 1975a). Consequently, Greer, for example has suggested that these countries "should abandon patents en masse" (1973, 259). However, while the LDCs do accept the view that the cost involved in their participation in the international patent system greatly outweighs the benefits, they do not, at least by their continuing participation, seem to sympathise with the idea of abandonment. Instead they have so far preferred the revision of those provisions of the Convention which had adverse effects on their economies. It is not surprising, therefore, that, to some extent, through their initiative they have set in motion the current revision of the Convention.

The Diplomatic Conference on the Revision of the Paris Convention

The idea for the further revision of the Paris Convention to include additional provisions of special benefit to developing countries was put forward in 1974 and consequently led to the setting

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6. Similarly, the Canadian Working Paper on Patent Law Revision (1976) raises doubts about the benefits Canada derives from the international patent system.

up of the Ad hoc Group of Governmental Experts for the Revision of the Paris Convention (WIPO, 1985, 2).

At its second session the Group of Experts adopted a Declaration of Objectives of the Revision of the Paris Convention which include, inter alia, (1) the promotion of the actual working of inventions in each country, (2) the encouragement of inventive activity in developing countries, (3) the facilitation of the development of technology by developing countries and the improvement of the conditions for the transfer of technology under fair and reasonable terms, (4) the increase of the potential of developing countries in judging the real value of invention for which protection is sought, and (5) the proper balancing of the needs for economic and social development of countries on the one hand and the rights of patentees on the other (ibid.).

In addition, the Declaration of Objectives included consideration for certain defined cases in which exceptions or alterations to the principles of national treatment and independence of patents as well as preferential treatment for LDCs could be permitted. Also included was the provision for a maximum degree of freedom to each country to adopt appropriate measures on the legislative and administrative levels, consistent with its needs and social and economic development (WIPO, 1985, 3). These really are bold recommendations or moves which are in tune with present international economic development.

In pursuit of these objectives a Provisional Steering Committee of the Diplomatic Conference was set up by the Executive Committee of the Paris Union. The former Committee established the provisional Rules of Procedure of the Diplomatic Conference and took the necessary decisions concerning the preparation of the documents of the

Conference. It is these documents embodying the basic proposals for revision prepared by the Director General of WIPO and adopted and forwarded to the Diplomatic Conference by the Preparatory Intergovernmental Committee which serve as the basis of the current revision exercise. These proposals contain amendments to existing articles and the creation of new articles. The existing articles sought to be amended include Articles 5A and 5 quater, and the new articles comprise Articles A and B and 12 bis.

The proposal to amend Article 5A deals, especially, with the importation of articles covered by patents, failure to work patents, abuses of patent rights, exploitation of patents in the public interest and special provisions for developing countries. In the case of non-working or insufficient working, it would be possible for any country to provide for the grant of non-voluntary licences to work the patented invention. In addition, forfeiture and revocation would be available as subsidiary measures. In respect of abuses of the patent forfeiture and revocation would be available. Finally, where the public interest requires exploitation of the invention, it is proposed to permit national laws to authorise the exploitation of the invention by the state or any person designated by the competent national authorities. The major significant innovation is that shorter periods and easier requirements in invoking these measures have been proposed in favour of the LDCs (see the proposed Article 5A(8)(a); also see WIPO, 1985, 4 and WIPO, 1979). Also by virtue of proposed Article 5A(1)(b) importation would not constitute working of the patented invention. With respect to Article 5 quater, the basic proposal is that it be expunged entirely from the Convention, or at least the LDCs be exempted from its obligations. These are very bold alterations to

Article 5 which could go a long way to meet some of the demands of the LDCs concerning the article but could provoke a strong resistance from the developed countries.

The proposed new Article A seeks the reduction by one half of fees payable by inventors in the LDCs when applying for patent rights in other countries of the Union. Article B on the other hand provides for the increase by one half of the priority period to 18 months in favour of an applicant for an industrial property right who is a national or resident of a developing country. Though these articles if eventually adopted may give the LDCs some preferential treatment, they would not alter the basic effects of the concepts of national treatment and priority. The other new article, which appears to be more useful, is Article 12 bis which relates to the provision of information regarding patent applications filed for the same invention abroad, to the industrial property office of the country in which a patent has been applied for. The proposed article entitles a patent applicant or patentee to receive information concerning a corresponding application or patent for the same invention in any country of the Union where such information is required by another country of the Union. However, where the latter doubts the information furnished by the applicant it may request the former to provide it.

The first session of the Diplomatic Conference on the Revision of the Paris Convention took place in Geneva from February 4 to March 4, 1980. This session mainly occupied itself with the Rules of Procedure to govern the Conference. Nevertheless, during this session Article 12 bis and another two articles were adopted by the competent main Committee. The second session of this Conference took place in Nairobi from 28 September to 24 October, 1981. This session dealt

essentially with Article 5A of the Convention. After prolonged debate a new text of this article was tentatively agreed upon by the LDCs (the Group of 77), the DCs (Group B) and the Socialist Countries (Group D), with the United States, in particular, opposing some of the provisions, (WIPO 1982, 182 and WIPO, 1985, 9). Surprisingly enough, during the third session of the Diplomatic Conference held in Geneva from 4 to 30 October 1982, and from 23 to 27 November 1982, the controversial Article 5A on which progress was made at the Nairobi Conference was only negotiated in an informal body and not in the competent Main Committee. The fourth session of the Diplomatic Conference which took place in Geneva from 27 February to 24 March, 1984 also could not reach any agreement on Article 5A and it is difficult to surmise how many Diplomatic Conferences it will take for a decision to be reached on the article. However, it will be very naive to think the developed countries will give in so easily.

It is clear from the discussion of the Paris Convention that its provisions relating to the concepts of national treatment and priority as well as the subjects of compulsory licence and importation do not operate in the favour of the LDCs, and its for this reason that they are seeking a revision of the convention, particularly the provisions they consider to affect them most. However, in view of the developed countries' opposition to any fundamental changes in these provisions it will not be without greater difficulty that the LDCs will get accomplished the revision as required by them.

It is worth mentioning that in spite of the difficulties with the revision of the Paris Convention some positive efforts and policies on patents as well as the transfer of technology have been initiated at the international, national and regional levels.

UNCTAD

At the international level UNCTAD appears to be one of the most active organisations involved in the field of industrial property and the transfer of technology.

Patents

In the area of patents UNCTAD has contributed to efforts aimed at the revision of the Paris Convention. Its efforts in this respect has been remarkable not because a revision of the Convention has been accomplished, but because they have succeeded in creating an awareness among the LDCs of the inadequacies in the international patent system.

Through its efforts - mainly reports - UNCTAD has been able to draw the attention of LDCs to the lop-sidedness of the Paris Convention and how it affected them, and has suggested relevant areas as targets for revision (See, for example, UNCTAD, 1977a). In addition, UNCTAD's contribution in this respect can be seen in the useful suggestions in the changes in LDCs' domestic patent system in order to enable them use it as a tool for national development (See UNCTAD, (1975a), and (1975e) and (1981)).

Transfer of Technology: UNCTAD's Code of Conduct on the Transfer of Technology

Though the contribution of UNCTAD in the area of technology transfer is diverse, it is usually associated with its code of conduct on the transfer of technology.

The first initiatives for the elaboration of a code of conduct that would establish world-wide acceptable norms and standards of transfer of technology transactions were spearheaded by the LDCs both inside and outside the UN forums and subsequently endorsed by the international community. To give meaning to this endorsement the UN General Assembly, at its sixth special session in May 1974, by Resolution 3202(S-VI) on the Programme of Action on the establishment of a NIEO, called for the formulation of an international code of conduct on the transfer of technology corresponding to the needs and conditions prevalent in developing countries. The Assembly reiterated this call by its adoption of resolution 3362(S-VII) at its seventh special session on development and international co-operation (UNCTAD, 1985b). It decided, in the same resolution, that work on the Code should be continued within UNCTAD, where an intergovernmental group of experts was already engaged in the preparation of a draft outline to serve as a basis for the formulation of a code of conduct.

Following the above resolutions of the General Assembly, resolution 89(IV) of the United Nations Conference on Trade and Development held in Nairobi in 1976, and the decision of the General Assembly, by its resolution 32/188 of December 1977, to convene a UN Conference on the Code under the auspices of UNCTAD to negotiate the draft and take all decisions necessary for its adoption six sessions have so far been held between 1978 and 1985. The sixth being held in Geneva from 13 May to 5 June 1985 (UNCTAD, 1985b) to consider the present draft.

The present draft code consists of a preamble and nine chapters. Chapter One deals with definitions and scope of application, Chapter Two, objectives and principles, Chapter Three, national regulation of transfer of technology transactions, and Chapter Four, restrictive

practices. Chapters Five, Six, Seven, Eight and Nine deal with responsibilities and obligations of parties to transfer of technology transactions, special treatment for developing countries, international collaboration, international institutional machinery, and applicable law and settlement of disputes respectively.

The substantive provisions of the draft code, following UNCTAD classification, may be classified into two broad categories: (1) those concerning the regulation of transfer of technology transactions and the conduct of the parties to them, and (ii) those relating to action to be taken by Government, either on account of their national policies or in order to meet their commitments to the code. The first category of provisions are contained in Chapters Four, Five and Nine, and the second contained in Chapters Three, Six, Seven and Eight. The provisions of the code falling under the second category are all agreed upon, except for two subparagraphs in Chapter Eight in respect of the nature of the international institutional machinery and the nature, mandate and timing of the Review Conference (UNCTAD, 1985b).

On the other hand, most of the issues which are still outstanding in the draft code fall under the first category, particularly under Chapters Four and Nine. By contrast, all the provisions of Chapter Five, with the exception of the subparagraph on confidentiality have been successfully negotiated and agreed on by all regional groups. With respect to Chapter Four, the conference has so far succeeded in drawing up a list of 14 practices to be avoided by parties to technology transfer transactions. However, the extent of application of three of these practices namely, export restrictions, improvement or grant-back provisions and post expiration restrictions are yet to be elaborated and clarified. Another stumbling block to the negotiations on Chapter Four has been, and still is, the

formulation of an introductory section, that is a chapeau, which would set forth the characteristics of the practices to be avoided, the circumstances under which they should be avoided, and the applicability of the provisions of the chapter to transactions between affiliated enterprises. It is worth mentioning that while considerable progress was made during the sixth session of the conference in this regard, some differences still exist among regional groups.

In respect of Chapter Nine, which has not yet been formally drafted, while it does appear that there is a broad con$ensus on the formulation of the provisions on conciliation and arbitration, there are still differences in the approaches proposed by regional groups with respect to the provisions on the choice of law. Consequently, during the sixth session held in May 1985, negotiations on the chapter centred on reconciling the differences between the Group B countries and to some extent the Group D countries which favour a clearer recognition of the contractual freedom of the parties to choose the law applicable to their contractual relations, and the Group of 77 which wish to emphasise the observance by the parties, in choosing the law applicable to their relations, of the binding rules of the laws of their countries which cannot be derogated from the contract[7] (See UNCTAD, 1985b). These differences remain outstanding and it is hoped that the efforts initiated by the President of the sixth session will be pursued further to bridge the gap between the regional groups.

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7. For the respective positions of the various regional groups see UNCTAD (1985a, appendix B-E) or UNCTAD (1980a). See also Thompson, 1982, and Hamza 1984 for discussion on these positions.

While these efforts are being pursued at the international level some countries have taken steps to streamline their patent systems and technology transfer regulatory regimes in order to make them more relevant to their economy.

National Policies

Patents

The growing criticism on the role and benefits of the industrial property system, particularly patents, has resulted, in the 1970s, in reforms in the patent laws of a number of countries including some Latin American countries such as Brazil in 1971, the Andean Pact countries in 1974 (Decision 85), Mexico in 1976, as well as India in 1970. These countries have reformed their patent legislation aiming, inter alia, at redefining the concept of "invention", on the basis of a subjective concept requiring inventive activity as an essential element of the invention (See Articles 1 and 2 of Decision 85).

In addition, these reforms seek to clarify and strengthen the conditions for the working of patents (see Article 83 of the 1970 Indian Patent law). To this end the Mexican law on inventions and trademarks of 1975, for example, embodies a specific definition of exploitation which includes "the permanent use of the patented process or manufacture of the product covered by the patent" (Article 43). Similarly, some countries, particularly the Andean Pact members, have provided shorter patent grant duration of about five years with a possible additional five years provided the patent is adequately worked (Article 29 of Decision 85). Peru and India have also provided shorter period of duration. For the same purpose most of these countries have provided for compulsory licensing as a primary remedy

against non-working and expanded the grounds for its procurement.

Moreover, the reforms also seek to eliminate the monopoly of imports granted to the patentee. For example, the Mexican law and Decision 85 do not only exclude importation from the meaning of exploitation (See Articles 43 and 31 respectively), but also except it from the patent monopoly grant. The proviso to Article 37 of the Mexican law provides explicitly that patents "shall not confer the right to import the patented product or a product manufactured by means of the patented process". Similarly, the proviso to Article 28 of Decision 85 also provides that a patent "shall not confer an exclusive right to import the patented product or one manufactured under his patented process". All these are aimed at combatting the abuses of the import monopoly of patentees and ensuring the domestic working of inventions for which monopoly grants are conferred.

Finally, the reforms are also aimed at suppressing patentability in certain economic sectors. Article 5(c) of Decision 85 excludes, inter alia, from patentability "pharmaceutical products, medications, active therapeutic substances, beverages and food for human, or animal or vegetable consumption". This provision, like the others under the Decision, is currently in force in Ecuador, Colombia and Peru. Similarly, Mexican and Brazilian laws on inventions also except pharmaceutical products from patentability. The exclusion particularly of pharmaceutical products from the grant of patents in most Latin American countries may be attributed to the unreasonably high cost of imported drugs and pharmaceutical products. In the case of products falling under other economic sectors, their exclusion from patentability, as in the case of Decision 85, may be founded on economic development grounds (see Article 5(e) of the Decision 85).

It is clear from the above that some LDCs have reformed their patent laws to make them more relevant to their economies as well as assist in their economic development process. While there has been a decline in patent applications, particularly from foreign application since these reforms were introduced, it is early yet to know their full impact.

Transfer of Technology

Another area where national efforts have been evident is the transfer of technology. During the 1960's a set of circumstances brought the attention of governments especially of the Latin American countries to the characteristics and effects of technology imports. Among these were the impact of royalties and technical fees on the balance of payments, the imposition of restrictive practices, as well as the need to control technology imports on a broader basis and to increase the control of the host country's technological development and economy.

All this called for government intervention in the technology market which is imperfect and places recipient enterprises of the LDCs in a disadvantageous position vis-a-vis the DCs technology suppliers. Consequently, technology transfer regimes were established to regulate technology transactions. In general, the objectives of these regimes include the improvement of the commercial conditions of agreements, especially as regards prices charged by technology suppliers, the elimination of restrictive practices and the unpackaging of different components included in technology transfers. Other aims of these regimes encompass the avoidance of duplicating available technology, improvement of conditions for the adaptation and diffusion

of the transferred technology and the regulation of intra firm operations of transnational enterprises (see Correa, 1981).

The first general regulation in Latin America which systematically dealt with payments for transfer of technology is the Brazilian law 4,131 of 1962 (on foreign investments). It prescribed registration with the Superintendencia de Moeda e de Credito (now the Central Bank of Brazil) of agreements involving technical assistance or royalties and duration. One of the major innovations it introduced was to prohibit a foreign subsidiary from paying royalties for patents or trademark licences to its parent or controlling company (ibid.). This law as amended in 1964, law 5,772 (Codigo de Propriedade Industrial) and Normative Act No. Ø15 of 1975 constitute the legal framework for controlling technology transfer transactions in Brazil. The Brazilian experiment was followed, in 1967, by the establishment of new agencies in Colombia and Chile to regulate technology transfer transactions (ibid).

All these experiences influenced the formulation of the transfer of technology policy of the Andean Group which resulted in Decision 24 (197Ø). This Decision which regulates the transfer of technology also controls the access to and operation of foreign capital in the Andean countries. In addition, it has determined the creation of specific bodies for the approval of technology transfer agreements and foreign investments and identified a set of restrictive practices which are to be avoided. The Andean Pact members including Bolivia, Colombia, Ecuador, Peru and Venezuela have formally incorporated Decision 24.

Apart from the Latin American countries others which have introduced measures to regulate technology transfer transactions include India and the Philippines. India initiated the control of the transfer of technology transactions after independence in 1947, and

has, therefore, the longest experience in this field. Three main stages can be distinguished in the Indian experience. During the first stage, which covered the period after Independence up to 1968, foreign collaboration agreements were approved in connexion with the implementation of the general industrial policy by the Foreign Agreements Committee. In the course of the second stage, which covered the period between 1969 and 1978, a more developed system of control was established. This included the publication of guidelines regarding foreign collaboration agreements in 1969 and the promulgation of the Foreign Exchange Regulation Act of 1973 embodying provisions for technology transfer transactions by foreign owned companies. This period, especially after 1974 when a Technical Evaluation Committee was created, witnessed the beginning of the economic and technological evaluation of technology transfer agreements. The third stage, initiated in 1978, has included considerable improvement in the system of control, provisions which eliminate restrictive practices, the implementation of a monitoring system and revision of the guidelines relating to foreign collaboration agreements (See UNCTAD, 1980b).

Finally, the Philippines Technology Transfer Board (TTB) was created in 1978 and entrusted with the responsibility of registering and evaluating all technology transfer agreements. Before the creation of the TTB technology transfer transactions were approved by the Board of Investments on the basis of guidelines provided by a 1973 Central Bank circular (Bautista, 1980).

In almost all cases the regulatory regimes of the above mentioned countries exclude from technology transfer transactions anticompetitive practices such as export restrictions, tie-ins, grant-backs and restrictions on R & D. They also prescribe royalty ceiling and duration for all agreements. Furthermore, they exclude

other practices which may have adverse effects on their economies. Though some of these regimes are in their embryonic stage, most of them have registered some success in the reduction of royalty payments and duration of agreements and exclusion of certain restrictive practices. However, in view of the weak monitoring system in most of these countries it is difficult to measure the degree of their recorded success. It may also be mentioned that these controls have not affected the inflow of technology into the countries concerned (UNCTAD, 1980b).

Regional Efforts

In addition to the international and national efforts, attempts have been made and are still being made on a regional basis to improve upon the patent and technology transfer regimes, as well as technology development.

Patents

One of the earliest regional agreements in the field of industrial property was the Montevideo's Convention on Patents of Invention of 6 January 1899. This was followed by the Inter American Convention on Inventions signed at Buenos Aires on 20 August 1900, and the Convention on Patents and Privileges signed at Caracas on 18 July 1911 between the countries which form the present Andean Group. Presently, the Andean Pact, and in particular its Decision 85, already referred to, represents one of the most genuine regional efforts in relation to patents.

In Europe, the European Patent Convention (EPC) signed in Munich in 1973 by 16 European countries, and the Community Patent Convention (CPC) signed in 1976 by the E.E.C. countries represent an attempt to construct a supra-national patent system. The CPC provides for a unitary grant throughout the E.E.C. It is, unlike the EPC, not yet in force.

The African and Malagasy Industrial Property Convention (OAMPI) signed at Libreville on 13 September 1962 by 13 French-speaking African countries represents the first attempt towards greater unification and administration of patents on the African continent. The OAMPI has a central patent office in Yaounde (Cameroon) which registers the filing of patent applications and issues patent grants which have effect in each member state. However, the rights ensuing from the grant are regarded as separate national rights for which the courts of the individual countries are competent.

A recent African regional endeavour with respect to industrial property was the adoption at Lusaka in December 1976, of an agreement on the creation of an Industrial Property Organisation for English Speaking Africa (ESARIPO) by mostly English speaking African countries including Ghana and Nigeria. This agreement was signed on 9 December 1976. In spite of ESARIPO's present membership (English-speaking African countries) it is opened to other states which are members of the United Nations Economic Commission for Africa (UNECA). So far ESARIPO has come out with a model law on patents (1978) for its member states, some provisions of which we shall discuss in due course, and a model law on trademarks. The model law on patents was prepared by the Secretariats of WIPO and UNECA under the auspices of ESARIPO's committee for patent matters.

It may be added that the WIPO, which was set up to succeed the United Industrial Bureaux for the Protection of Intellectual Property (BIRPI) by the WIPO Convention adopted at Stockholm in 1967 by the same diplomatic conference which revised the Paris Convention for the sixth time, has also contributed to regional efforts, particularly among the LDCs. It has offered advice and technical assistance to ESARIPO and OAMPI and others. It has also attempted to harmonize LDCs' patent laws and bring them into line with the Paris Convention. This is manifested in the provisions of its Model Law for developing countries on inventions (Vol. 1) published in 1979, which is a revision of its predecessor's Model Law, the BIRPI Model Law for developing countries on inventions published in 1965. We shall discuss some of the major provisions of these model laws in subsequent chapters.

Transfer of Technology

The Andean pact efforts and policies (see Decision 24) already referred to, represent one of the most genuine regional efforts in the regulation and development of technology. It is appropriate to mention also that WIPO has contributed to regional efforts, particularly among LDCs. It has published a guide on the legal aspects of the negotiation and preparation of industrial property licences and technology transfer agreements appropriate to the needs of the LDCs (WIPO, 1977) and a WIPO (1980) Model Law for developing countries on inventions (Vol. II) which covers know-how.

In Africa, regional efforts or policies in the regulation of technology transfer are absent. Nevertheless, the establishment in

1977 of the African Regional Centre for Technology (ARCT) which is based in Dakar, Senegal represents an African regional effort in respect of the development and utilization of technology. The ARCT is an inter-governmental institution established under the auspices of the UN and Organisation of African Unity (OAU). Its objectives include, inter alia, contributing to the development and use of technology within its members states, strengthening their technological capabilities and assisting in the formulation of technology polices as an integral part of planned scientific, technological and socio-economic development.

Conclusion

In this chapter, we have discussed the development of the international patent system and examined the provisions of the Paris Convention on the concepts of national treatment and priority, independence of patents, compulsory licensing and importation. In addition, we have assessed the diplomatic revision exercise regarding the Paris Convention and surveyed various international, national and regional efforts and policies aimed at improving the patent system as well as the transfer and development of technology, particularly for the benefits of developing countries.

It is clear from the above that in addition to the efforts towards the revision of the Paris Convention some LDCs have taken steps to align their patent systems and technology transfer regulatory regimes to the needs and development of their respective economies. These steps, in respect of patents, are based, inter alia, on the exploitation of inventions in the granting country and exclusion of

import monopolies. As regards technology transfer, they are based on policies relating to the country's balance of payment position, the exclusion of available technology and the ability to use the transferred technology to develop the country's technological capability and economy. In the subsequent chapters we intend to investigate the national patent and technology transfer laws of both Ghana and Nigeria, and, in the process, ascertain whether they are underpinned by similar or any other considerations.

CHAPTER 3

THE HISTORICAL DEVELOPMENT OF THE PATENT SYSTEM IN GHANA AND NIGERIA

Introduction

The historical development of the patent system of most less developed countries, especially those which did experience, and are still experiencing colonial rule can, generally, be traced to the 1879 Patent Conference held in Paris where it was agreed that the patent laws and systems of the colonial masters should be extended to the colonies (Penrose, 1951, 53). It may, however, appear that in the case of countries such as Ghana, Nigeria and the former British West African colonies this agreement to stretch the patent laws of the metropolitan countries to them did not have any immediate impact until 1898.

The Historical Development of Patent Laws of Ghana and Nigeria

The historical development of the patent system of all the former British West African colonies including Ghana (the then Gold Coast) and Nigeria can be specifically traced to the development of the system in the Gold Coast. In fact, as we shall shortly see, it was the final draft of the then Gold Coast's patent bill which, served as the basis of the various patent laws of the remaining mentioned colonies including Nigeria.

The Introduction of Patent Law and System in the Then Gold Coast

The development of the present patent system of present Ghana (the then Gold Coast) can be traced to the year 1898 when the Secretary of State for the Colonies sent a despatch[1] transmitting a copy of a letter from Messrs. H. & W. Pataky, patent agents, to the then Acting Governor of the Colony of Gold Coast enquiring generally about the procedure for obtaining patent protection on the Gold Coast for an invention patented in England. The response from the Acting Governor was that patent protection for invention could not be obtained in the Colony because there was no patent legislation there.

The receipt of this response from the Governor put the need of enacting a patent law for the Gold Coast under the consideration of the Colonial Office[2]. Consequently, the latter asked the Board of Trade for its advice on the need for a patent law for the Gold Coast to be modelled on that of British Honduras dated 1862[3].

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1. This is despatch No. 52 of 28 January 1898 in C.O. 96 Gold Coast 1898 Vol. XXVII, 336.
2. See Despatch No. 208 of 25 May 1898 in C.O. 96 Gold Coast 1898, Vol. XX, 329 and also Secretary of State for the Colonies' letter dated 30 April 1898 to the Board of Trade in C.O. 96 Gold Coast 1898, Vol. IV, 313, Mar 9-31.
3. See Secretary of state for the Colonies' letter dated 30 April 1898 to the Board.

In its reaction[4] the Board of Trade, after consultations with the Controller-General of Patents, endorsed the desirability of enacting a patent law on the Gold Coast, but suggested, however, for the consideration of the Colonial Office that it should be modelled on the British Patents, Designs and Trade Marks Acts 1883 to 1888. The Board also pointed out that similar laws had been introduced in some colonies, and it suggested the Patent Act No. 5 of 1888 of Western Australia which was so based as a suitable model for the Gold Coast Colony. It rejected the British Honduras Act of 1862, mainly because it was apparently based upon the British Patent Law Amendment Act of 1852 which had then been repealed and replaced by the Patents, Designs and Trade Marks Act of 1883[5].

A copy of the Western Australian Act was sent to the then Acting Governor of the Colony with instructions[6] to prepare a draft ordinance based on it to be submitted to the Colonial Office for ratification. Consequently, a draft ordinance was prepared in the Gold Coast Colony without any serious legislative deliberations[7] and

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4. See the Board of Trade's letter dated 16 May 1898 in C.O. 96, Gold Coast 1898, Vol. XX, 329.
5. This Amendment Act simplified substantially the proceedings regarding the procurement and upholding of patent groups.
6. See Despatch No. 208 of 25 March 1898 in C.O. 96.
7. A cursory perusal of the minutes of the Legislative Council on its deliberations in respect of the Ordinance (C.O. 98 Gold Coast, Minutes of Legislative Council 1899-1904, 11) shows that the Council only had to go through the bill as a matter of course. In addition, revelations by the draft Ordinance to be discussed in subsequent paragraphs confirm this point.

thereafter submitted to the Colonial Office in London.

The process of ratifying the draft ordinance resulted in its considerable alteration by the Colonial Office in conjunction with the Board of Trade and the Controller-General. In the first place, the draft ordinance followed closely the West Australian Patent Act of 1888[8] and was almost a carbon copy of it. The similarity was so close that a clerical error[9] which occured in the latter but corrected by the subsequent amending Act of 1894 was reproduced in the draft ordinance. In addition, subsequent amendments that were made to the 1888 Australian law in 1892 and 1894 as well as the alterations in the British Act of 1883 since 1885 had not been taken into consideration in the drafting of the ordinance, and, thus, not incorporated.

One change was the decision not to copy S.49 of the Western Australian Act of 1888 which provided, inter alia, that no person should receive a patent for an invention or discovery which had previously been patented in Great Britain or any other country. The practical and administrative problems and the cost of an official search for novelty necessitated by such an enactment, as pointed out by the Controller-General, prevented any similar legislation from

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8. This Act is itself based on British legislation up to 1885.
9. Clause 9, Sub-clause 2 of the draft Ordinance was apparently intended to provide that security for costs may be required from the opponents - but what would appear to be a clerical error occurs, "applicant" being written for "person giving such notice".

being adopted in Great Britain.[10] Nevertheless, clause 48 of the Gold Coast draft ordinance followed section 49 of the Western Australian Act of 1888, and the Board of Trade rightly expressed its doubt about the capability of the Chief Registrar of the Gold Coast to undertake the type of search contemplated by the clause with any reasonable chance or prospect of success. Another worrying aspect about the clause was the cost likely to accompany its execution especially so as it was desired by the Attorney-General of the Colony that "the ordinance must be worked at the least possible expense to the Government."[11]

As a result of the above considerations the draft ordinance was considerably altered[12] to embody the amendments and alterations made in the model laws, and thereafter sent to the Gold Coast for enactment. The major changes that were finally made to the ordinance included the abandonment of the world-wide novelty requirement and, in addition, the inclusion, in view of the international patent convention, of the priority concept. Another major change was the expunging of sub-clause 2 of Clause 6 which permitted an application for a patent grant by persons entitled by bequest from deceased person. As argued by the Board of Trade, such a provision never

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10. The Board of Trade's letter dated 25 January 1899 addressed to the Secretary of State for the colonies (C.O. 96 Gold Coast 189, 349) was very critical of the draft ordinance and the Board contributed greatly to modifying it.

11. Ibid.

12. The draft ordinance was amended in red ink on the lines proposed by the Controller-General of Patents and returned to the Colony ready for enactment.

appeared in any British Act on the subject, and though it did appear in the 1888 West Australian Act it had since been repealed by the 1894 Ordinance. However, in the case of applications by legal representatives of a deceased actual inventor or of his assigns, also covered by the same sub-clause 2, this was adopted by the ordinance apparently because it was reintroduced by the definition of true and first inventor in S.6 of the Western Australian Act of 1894.

Some of the other alterations made to the draft ordinance included the extension of the provisions of Clause 45[13] of the draft ordinance which related to exhibitions to include international exhibitions as well. (See S.44 of the 1899 Ordinance). This was to conform to S.3 of the British Act of 1886. Moreover, S.4(3) of the 1899 Ordinance, unlike Clause 5 of the draft ordinance, but like the relevant section under the 1894 revised Western Australian ordinance, exhaustively specified the persons entitled to apply for a patent. Again unlike the draft ordinance the final ordinance adopted a separate clause on the legality of a patent grant to several applicants. (See S.4(2) of the Ordinance). Finally, there was the substitution of the phrase "proceeding for revocation" by the final ordinance (See S.21 (10) of the Ordinance) so as to conform to S.5 of the British Act of 1888.

Finally, an interesting alteration that was made to the ordinance is contained in S.11 (2) which provided for security for costs by the opponent to a grant of patent. This sub-section rectified a clerical error which substituted "applicant" for "person giving such notice". (See Clause 9 (2) of the draft ordinance). This

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13. Clause 45 was the same as S.39 of the British Act of 1883 and as the Western Australian Act of 1888.

error occured in the Western Australian Act of 1888 but was subsequently corrected by amending Act of 1894 which apparently escaped the Gold Coast legislators.

It is interesting to note that even before the final enactment of the amended draft ordinance, it had been decided by the Colonial Office to send copies of the ordinance after it had been finally passed to other West African colonies, including the Lagos colony, the Southern and Northern Nigerian protectorates - which now constitute Nigeria - with instructions to pass a similar ordinance.[14] Before discussing the essentials of this Patent Ordinance it may be appropriate to pause here and ask why the Colonial Office introduced a patent law in the Gold Coast and used same as a model for the other former English West African colonies.

Rationale for the Introduction of Patent Law in the Then Gold Coast (now Ghana)

The usual arguments advanced for the introduction of patent laws or the patent system in general include the fact that it spurs inventiveness, research and development (R&D), innovation, and, as between industries or countries, the transfer of technology (Supra).

However, in the case of the Gold Coast the development of the mining industry, especially the gold mining industry, was the pivotal consideration for the introduction of a patent law there. This is brought out lucidly by the Colonial Office when it stated in a letter to the Board of Trade that:

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14. See C.O. 96 Gold Coast 1899, 349.

> There is at present no patent legislation in force in the colony [Gold Coast], but in view of the development of the gold mining district of Tarkwa, and the consequent introduction of machinery etc. Mr. Chamberlain [Colonial Secretary] thinks it would be well to take steps to afford protection to invention.[15]

This consideration was reiterated by the Secretary of State for the Colonies when in a letter to the then Acting Governor he wrote:

> I have under consideration the advisability of enacting patent legislation for the Gold Coast in view of the introduction of patented machinery and processes which will probably follow on the development of the mining industry.[16]

It is abundantly clear that the introduction of the Patent Ordinance in the Gold Coast did not rest on the usual arguments advanced for the patent system (Supra). It may, however, be forcefully argued that the Ordinance also sought to facilitate the transfer of technology to the colony, though primarily for the benefit of the gold industry; the spill-over effect and the contribution thereof to the general development of the colony will be difficult to contest. Nevertheless,

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15. Colonial office's letter of 30 April 1898 to the Board of Trade in C.O. 96 Gold Coast 1898, Vol. IV, March 9-31, 313.
16. Secretary of State for the Colonies's letter of 25 May 1898 in C.O. 98 Gold Coast 1898, Vol. XX, 329 [Public Offices].

it is only when one comes to realise or appreciate the overall objective of imperialism or colonialism as well as the community that benefited from this "transfer of technology" that one finds any such argument unconvincing.

As discernable from the above quotations the introduction of the Ordinance was never meant to encourage either indigenous inventive activity, local R&D, innovation or to accomplish an effective technology transfer. It was geared rather towards the protection of property rights in machine technology relevant for the exploitation of the gold and other mineral resources of the Colony. This is not surprising since the main aim of imperialism and subsequent colonialism was the investment of excess capital in and exploitation of mineral and human resources of the colonies.

It is appropriate to point out here that the gold industry, which as we have seen prompted the enactment of the Patent Ordinance, was the cornerstone of colonial British economic programmes and policies for the Gold Coast Colony. It did serve as a pivot for almost every single programme that was initiated and implemented in the colony.[17]

Patent Ordinance No. 1 of 1899

The gold industry, therefore, unquestionably brought into existence the first patent law of present Ghana. This was the Patent

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17. For example, the gold industry considerably accounts for the present structure of the railway line in Ghana. The initial scheme of linking the coastal regions with the North was abandoned on the discovery of gold in the Tarkwa district.

Ordinance No. 1 of 1899, which was adopted almost in its entirety in the remaining former British West African Colonies. This Ordinance's counterpart in the former Lagos Colony and the two protectorates which form present Nigeria were the Patent Ordinance 1900 of the Colony of Lagos, the Patent Proclamation No. 27, 1900 of Southern Nigeria (as amended by Patent Amendment Proclamation No. 19, 1901) and Patent Proclamation No. 12, 1902, of Northern Nigeria. After the amalgamation of Northern and Southern Nigeria (the Colony of Lagos and the then Southern Nigeria) all these Ordinances were repealed and in their place was enacted a single patent ordinance - Patents Ordinance No. 30 of 1916 (infra).

The provisions of the Gold Coast's Patent Ordinance and those of the Lagos colony and the Northern and Southern Nigerian protectorates were virtually identical. In his letter to the Crown for confirmation and approval for the Patent Ordinance of the Colony of Lagos, and thus praying for the accordance of the royal assent to this enactment, which was subsequently re-enacted for both Southern and Northern Nigeria, the Governor of the Lagos Colony made it very clear that the Ordinance was "based on the Imperial Statute and Gold Colast Ordinance dealing with the matter".[18] He added, however, that certain necessary alterations which local requirements of the Colony of Lagos demanded were inserted in the Ordinance.[19] Thus creating the impression that some significant dissimilarities existed between the two ordinances. This is not entirely true and any differences that existed mainly related to the chronological table of ordinances.

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18. C.O. 147 Lagos 1900, Vol. 14, 151, Despatches Nos. 235-332, 21 Sept - 31 Dec.

19. Ibid.

As confirmed by the Board of Trade, whose comments were sought on the Ordinance, "this Ordinance [Patent Ordinance of Lagos Colony] is mutatis mutandis, the same as the Gold Coast... the only difference being the omission in Sec. 5(e) of a chronological table of Ordinances"[20]. Consequently, the discussion of some of the provisions of the Patent Ordinance 1899 of the Gold Coast that follows shortly, could broadly be taken to represent those of the other ordinances.

The Patent Ordinance No. 1, 1899, of the Gold Coast contained comprehensive provisions for the grant and control of patents and was analogous to both the Western Australian and English enactments on the same subject during that period. It set up a Patent Office under the control of a registrar whose functions were similar to the Controller-General of the Patents Office in the United Kingdom.

Application for a Patent Grant

The Ordinance made adequate provisions for applications and application procedures for obtaining patent rights in the Gold Coast. Applications for patents were made in the relevant forms (S.5(11)) and together with their accompaniments, such as specifications, relevant drawings and declarations, were lodged with the Patent Office (S.5(2) and (3)). Appeals from the decisions of the Registrar concerning such applications lay to the Attorney-General (S.7(2)) who could procure the aid of experts in the determination of such appeals.

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20. Ibid.

In respect of patent applicants the Ordinance makes interesting provisions, and provides for three categories of applicants. Under S.4(1) any person, "whether a British subject or not", could apply for a patent. Any such person had to be either the actual inventor, his assigns, the actual inventor jointly with the assigns of a party interested in the invention, the legal representative of a deceased actual inventor or of his assigns, or any person to whom the invention has been communicated by the actual inventor, his legal representatives or assigns (if the latter group of persons were not resident in the colony) (S.4(3)). This provisions closely followed that of the 1894 West Australian Act, and corresponded to sections 4 of the Patent Ordinances of the Lagos Colony, the Southern and Northern Nigerian protectorates.

A second category of persons competent to apply for a patent under the Ordinance was that of holders or assignees of patents granted or issued in Great Britain or any other country for any new discovery or invention (S.47). The only requirements to be satisfied here before the Governor exercised his discretion to grant any patents to this class of applicants were (i) that the applicant was the bona fide holder or assignee of the said patent, (ii) that the said patent was in full force, and (iii) the payment into the government treasury of the equivalent sum of £15. S.47 of the Gold Coast Ordinance was the same as S.XLVII of Southern Nigerian Ordinance and S.47 of the Northern Nigerian Ordinance. The provisions under S.47 appears, however, to have been omitted from the Lagos Colony's Ordinance and it is this omission which seems to me to be the only significant difference between the Ordinances of the Gold Coast and Lagos colonies.

The final category of applicants who could apply for and obtain a Gold coast patent grant were those who had applied for protection for any invention in England or in any foreign state with the government of which Her Majesty had made an arrangement, under S. 103 of the Imperial Patents, Designs and Trade Marks Act, 1883, for mutual protection of inventions (S.48(1)). Such applicants were entitled to a patent for their inventions in priority to other applicants, and the effective date of their applications was the same as the date of the prior applications in England or such foreign countries. However, for such applications to qualify for priority they had to be made within seven months from the date of their prior applications (S.48(2)). This represents the patent bilateral and reciprocal arrangements that existed between countries before the introduction of the priority concept by the Paris Convention. The equivalent of the provisions here under the Patent Ordinances of the Lagos colony, the Southern and Northern Nigeria were those provided by Sections 53, XLVIII, and 48 respectively.

Examination of a Patent Application

Under the Ordinance the Registrar was vested with a discretion to refer any patent application to an examiner for the purposes of examination. The issues for determination by the examiner were confined to whether the nature of the invention had been fairly described and the application, specification and drawings, if any, had been prepared in the prescribed manner. (S.6). The provision corresponded to those under the respective sections 6 of the Ordinances of the Colony of Lagos, the Southern and Northern Nigerian

Protectorates. The final issue to be ascertained was whether the application sufficiently indicated the subject-matter of the invention (Ibid). The Registrar, on receipt of the examiner's report, could, if he was of the opinion that the application did not meet the requirements discussed, refuse to accept the application or require the effectuation of any amendments deemed necessary before proceeding with the application.

It is very clear from the above that the examination required by the Ordinance was one of form and not of substance. This could be attributable to the fact that the Colonial government was most anxious to see the Ordinance worked at the least possible expense to the government (Supra). Moreover, the doubtful capability of the Registrar and his staff as well as the dearth of qualified personnel to undertake the sort of examination required by examination as to substance contributed to the adoption of the registration system.

Term and Grant of a Patent

On the satisfaction of the necessary formal requirements, the Governor in the name of Her Majesty granted patent rights (S.17). Such grants could be made to several applicants jointly although only some or one of them were or was the true and first inventors or inventor (S.18). The duration of patent granted under the Ordinance, apart from any grant made under SS.47 and 48,[21] was limited to 14 years (S.2Ø). The provision here followed S.22 of the Western Australian Act of 1888 and S.17 of the British Act of 1883, and was the same as S.21 (1) of Lagos Colony's Ordinance, S.XX of Southern and

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21. The term of grants made under these sections are tied to those of the original grants and to the prior applications respectively.

S.20 of Northern Nigerian Ordinances. Though the Ordinance did not specify the rights derivable under a patent grant it could be assumed that they included the monopoly right to manufacture, sell or import the patented product or product manufactured by a patented process, and the right to prevent others from infringing the said monopoly rights.

Patent-Abuse-Checking Measures

There were also provided under the Ordinance measures to check abuses of patent grants. These included compulsory licensing and revocation.

Under S.25 compulsory licences were available if it was proved to the Governor-in-Council by any person interested that by reason of the default of a patentee to grant licences on reasonable terms, the patent was not being worked, the reasonable requirements of the public with regard to the invention could not be supplied, or any person was prevented from effectively and efficiently exploiting an invention of which he was possessed. On any of these grounds the Governor-in-Council could order the patentee to grant licences on such terms as to the amount of royalties and security for payment as it deemed fit, and any such order could, on application to the court, be enforced by mandamus.

The measure of revocation could be obtained by a petition to the court (S.29(21)). The Ordinance explicitly excluded any proceeding by Scire facias[22] to revoke a patent. Any petition to the court for

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22. Scire facias to repeal letters is a judicial writ founded upon some matter of record, such as a judgement or recognizance and requiring the person against whom it is brought to show course why the record should not be annulled and vacated.

the revocation of a patent could be brought by (1) the Attorney-General, (2) his representative, (3) any person alleging that the patent was obtained in fraud of his rights, or of the rights of any person under or through whom he claims, (4) any person claiming that he, or any person under or through whom he claimed, was the true inventor of any invention included in the patentee's claim, and (5) any person who alleged that he or any person under or through whom he claimed an interest in any trade, business, or manufacture had overtly manufactured, used or sold, within the colony, before the date of the patent, anything claimed by the patentee as his invention (S.29(4)). This last provisions is significant for two reasons. First, it made it possible for any such person to contest any attempt by patentees via the patent system to disrupt the former's business and manufacturing activities which had long been in existence but for which no protection was procured. Secondly, it appeared to discourage the duplication of existing technologies in the colony by making it possible to revoke patent grants conferred on new entrants in the same available technology. Similar patents-abuse-checking measures (that is, compulsory licences and revocation) were provided by Sections 26 and 36 of the Lagos colony's Ordinance, Sections XXV and XXIX of Southern, and Sections 25 and 29 of Northern Nigerian Ordinances.

Apart from the above provisions the Ordinance equally made elaborate provisions on issues such as specifications (both provisional and complete), legal proceedings regarding patents, opposition to the grant of patents and powers of the Registrar of Patents.

It would have been useful and interesting to see how this

Ordinance and its counterpart Ordinances of Nigeria operated, for example, by way of how many patents were filed under the Ordinance, the sources of the inventions involved, the various industrial fields under which they fell and the number of compulsory licences that were granted as well as the number of patents that were revoked, if any. Unfortunately, documents covering the period within which these Ordinances operated are either missing from or unavailable at both the Accra and Lagos Offices and it would therefore be difficult to embark on any such exercise. In the case of the Accra office, it was explained by the Registrar-General's Department that these documents must have got lost in the process of transferring them from the Supreme Court Buildings to the Offices of the Registrar-General's Department after the administration of patents had been transferred from the Courts to the latter.[23] No explanation was given by the Lagos Office for these missing documents.

The Gold Coast Patent Ordinance No. 1, 1899 operated for about two and half decades when it was repealed in 1925 and replaced by the Patents Registration Ordinance, 1925 (Cap. 179) which drastically restructured the then independent patent system in the colony (infra). The counterpart Ordinances of the Lagos Colony, Southern and Northern Nigeria, on the other hand, operated for about one and half decades until they were all repealed in 1916. In their place was enacted one single patent ordinance, the Patents Ordinance, No. 30, 1916, which applied throughout the whole of Nigeria, and was also subsequently replaced or substituted in 1925 by the Registration of United Kingdom Patents Ordinance No. 6, 1925.

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23. Personal interview with the Registrar General in Accra, October 1984.

The Patents Ordinance No. 30, 1916

The promulgation of the Patents Ordinance No. 30 of 1916, instead of the autonomous patent system then in vogue, adopted the system by which a colony relied on the United Kingdom to examine applications for patent and merely registered patents already granted in the United Kingdom. Its introduction, therefore, completely destroyed the independent patent system then in existence in Nigeria. It may, therefore, be asked, what factors prompted this dramatic alteration in the existing law.

It does seem that, contrary to the impression that the 1916 Ordinance might have been necessitated by the 1914 amalgamation of the Southern and Northern Protectorates of Nigeria (See Ezejiofor, 1973, 40), it was rather the dearth of required technical personnel and the consequent lack of expert advice on the patentability of inventions submitted for patent grants which led to the adoption of this Ordinance. This was made quite explicit in his advocacy and justification for adopting this Ordinance when the Attorney-General of the Colony of Nigeria in his report on the draft Patent Ordinance 1916 stated:

> It is frequently impossible to obtain locally that expert advice which is required by the authority responsible for deciding whether or not a patent should be granted, and in the circumstances it is submitted that persons desiring to obtain protection

> in Nigeria, for an alleged invention may probably be required to satisfy first the Patents Office in the United Kingdom that his invention is one for which a patent should be granted.[24]

This justification for the introduction of the 1916 Ordinance was reiterated by the Governor-General in his letter on the subject to the Secretary of State for Colonies[25] and by the Colonial Office itself.[26] In supporting the adoption of the said Ordinance the latter also added that the colonial government did not have either "the experience or technical officers to work satisfactorily" the then existing system.[27] In addition, this reliance is also explained by the fact that the U.K. had had enough experience "in examining applications with some care before granting patents" and thus Nigeria, like other colonies, could rely on the U.K. for this purpose.[28]

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24. Report on the draft Patents Ordinance, 1916 by the Attorney-General of Nigeria dated 18.2.1916 in C.O. 583, 44, Despatches (Jan-Feb) Nigeria 1916, p546.

25. In the words of the Governor-General, "The difficulty of obtaining locally the expert advice necessary for a decision as to whether or not a patent should be granted is a very real one, and, in the circumstances, I consider it not unreasonable to require that the granting of a patent in Nigeria should be dependent on the applicant first satisfying the Patents office in the United Kingdom..." See C.O. 583, 44, Despatches (Jan-Feb) Nigeria 1916, p541.

26. C.O. 583, 44, Despatches (Jan-Feb) Nigeria 1916, p54Ø.

26. Ibid.

28. Ibid.

On the strength of the Governor-General's letter on the matter the Secretary of State for Colonies wrote on 26 April 1916 to approve the enactment of the draft Ordinance[29] which before this approval had already been published in the Gazette.[30] Consequently, on 13 July 1916 the Patent Ordinance No. 30, 1916, which was modelled on the Ordinances then in force in Hong Kong, East Africa, Uganda and Sierra Leone, but specifically on the latter,[31] was promulgated and came into effect on that day.

The Main Provisions of the 1916 Ordinance

The most significant provisions of Patent Ordinance No. 30, 1916 were those regarding applications for patents and the effect of patent grants.

Application for Patent

One of the fundamental changes that was introduced into the patent system of Nigeria related to patent applications which was governed by S.2 of the Ordinance. S.2(1) provided that:

> It shall be lawful for the inventor, or for the owner by assignment, transmission, or other operation of law, of any invention or of the exclusive right thereto within Nigeria to petition the Govenor for a patent for any invention for which a patent has already been granted in the United Kingdom....

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29. C.O. 583, 44 Despatches (Jan-Feb) Nigeria 1916, p547.

30. C.O. 583, 44 Despatches (Jan-Feb) Nigeria 1916, p541.

31. C.O. 583, 44 Despatches (Jan-Feb) Nigeria 1916, p546.

In order to appreciate the full import of this provision two things need to be made clear. First, the 1916 Ordinance repealed the then existing Patent Ordinance and Proclamations except in relation to any patents already granted or applications for patents already made thereunder. In effect, the practice of applying for patents directly in Nigeria and the entire autonomous patent system were truncated by this new Ordinance. Secondly, the new Ordinance did not, unlike the previous enactments, make any provisions for the procurement of original patents in the country. All this, therefore, meant that by virtue of S.2(1) every inventor whether a Nigerian or not desiring a Nigerian patent first had to obtain the U.K. patent grant before he could petition the Governor for a Nigerian patent for the same invention.[32]

For every such petition under S.2(1) it had to be accompanied by either the original patent granted for the invention in the U.K. or certified copy therefor (S.2 (2)), and, in addition, a certified copy of the complete specification which accompanied the prior application in the U.K. Finally, the petition had to be accompanied by the relevant statutory declarations (S.2(3)) and further necessary particulars (S.2 (5)).

Effect of Grant

The effect of a Nigerian patent grant was regulated by S.5(1) of the Ordinance. It provided that:

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32. See further discussions on a similar provision in Chapter 4

> .... a patent granted under this Ordinance shall confer all the rights and privileges and shall subject the grantees thereof to all the provisions affecting patents in the United Kingdom as fully as if the same had been granted, with an extension thereof to Nigeria, under the provisions of such statutes as are now in force in the United Kingdom or as near thereto as the circumstances shall admit of.

It is undoubtedly clear that the rights and privileges as well as the obligations of a Nigerian patentee were almost parallel to, if not the same as, those of U.K. patentees. One example of this parallelism which was expressly discernable from the Ordinance related to the term of the patent. The term of a Nigerian patent grant corresponded to the U.K.'s for the same invention. In fact, the former was dependent on the latter, and it was possible for a Nigerian patent to avail itself of the extension for a further term of its U.K. counterpart. According to S.6, if a court of competent jurisdiction in the U.K. extended the term of any patent grant for any further term or ordered the grant of a new patent the Governor-in-Council could on that basis extend the term of such patent, if already granted, for Nigeria or otherwise grant an original patent for a similar term for the same invention.

In effect, sections 5 and 6 in particular and the entire Ordinance, as the Attorney-General for the Colony hinted in his report on the Ordinance (draft), sought to extend "to the owner of a patent granted in the United Kingdom the same protection in Nigeria as he enjoys in the United Kingdom".[33] Another significant aspect of all

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33. C.O. 583, 44 Despatches (Jan-Feb) Nigeria, 1916, p546

this is that by virtue of these provisions, especially S.5, U.K. enactments on patents were implicitly but effectively introduced into and given force in Nigeria.

The 1916 Patents Ordinance consequently and successfully incorporated the Nigerian patents system into the U.K.'s. This is further confirmed by a perusal of the provisions governing revocation of patents. According to S.5(2), for the Supreme Court to entertain any grounds for the revocation of patents in Nigeria they should be ".... similar to those on which the revocation of a patent is justified in the United Kingdom..." Moreover, the same S.5(2) also provided that:

> .... a patent granted under this Ordinance shall not be revoked solely on the grounds that the patented article or process is manufactured or carried on exclusively or mainly outside Nigeria, if it is manufactured or carried on exclusively or mainly in the United Kingdom or in any British possession.

It is clear from the provision that, in addition to incorporating the Nigerian patent system into the U.K.'s, S.5(2) sought, to some extent, to align the former to the entire British colonial economic arrangement, which is typical of both imperialism and colonialism. The tacit definition of exploitation of patent in Nigeria as working in the U.K. or in any British possession is very instructive.

The 1916 Patents Ordinance operated until 1925 when it was substituted, a month after its introduction in the then Gold Coast, by the Registration of United Kingdom Patents Ordinance No. 6, 1925. Despite the Colonial Office's suggestion that the Gold Coast Colony should consider adopting the 1916 Ordinance,[34] the latter continued

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34. C.O. 583, 44 Despatches (Jan-Feb) Nigeria 1916, p540

to operate its 1899 Patent Ordinance until 1925 when it was also repealed by the Patents Registration Ordinance, 1925. The two 1925 Patents Registration Ordinances (that is, for both Ghana and Nigeria) were similar if not identical, and will therefore be treated under the same heading.

The Patents Registration Ordinance, 1925

The factors which accounted for the introduction of the 1925 Ordinance, especially in the Gold Coast Colony were similar to those responsible for the promulgation of the 1916 Ordinance in Nigeria. However, in addition to the inadequate technical personnel and the lack of experience for the satisfactory working of the then independent patent system, the paucity, it seems, of patents filed in the Gold Coast which were not solely U.K. patents also contributed to the enactment of the 1925 Ordinance. As hinted by the Colonial Office, in the case of Gibraltar which during that period had similar legislation, the Ordinance was considered relevant in view of the fewness of patents filed in the Colony.[35]

Consequently the Gold Coast Colonial government repealed the 1899 Patent Ordinance which established in the colony an autonomous patent system and in its place promulgated the Patents Registration Ordinance, 1925. The overall effect of the latter is similar to that of the 1916 Patent Ordinance of Nigeria. It also destroyed the independent system set up by its predecessor and aligned the Gold Coast patent system with the U.K.'s. The 1925 Gold Coast Ordinance

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35. See C.O. 96 Gold Coast 1989, Vol. XXVII, 336.

was introduced a month later in Nigeria and replaced the 1916 Ordinance. For the Gold Coast the 1925 Ordinance drastically altered its patent system while for Nigeria, on the other hand, it was merely a substitution of the title of one enactment by the other.

The introduction of the 1925 Ordinance in the Gold Coast marked the end of the historical development of the patent system of Ghana since it still continues to use this Ordinance, besides the minor alterations made thereto, as its main legal instrument for the grant and administration of patents in the country. The Ordinance will therefore be discussed in detail in Chapter Four. On the other hand, in the case of Nigeria very significant developments took place between 1925 and 1970 when the country eventually enacted its own independent patent law. These developments include the case of Rhone-Poulence S.A. and May & Baker Limited v Lodeka Pharmacy Limited, and the Patents Rights (Limitation) Decree 1968.

Rhone Poulence S.A. and May & Baker Ltd. V. Lodeka Pharmacy Ltd.

An interesting development in the patent system of Nigeria which took place before the 1925 Patent Ordinance was altered by the government is the case of Rhone-Poulence and Anor. V. Lodeka Pharmacy Limited.[36] The first plaintiff was the owner of the U.K. Patent No. 716207. This patent was sealed in December 1951 "in respect of improvements in or the new phenthiazine derivatives". Phenthiazine derivatives are chemical substances derived directly or indirectly from the substance phenthiazine and the compound known as

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36. [1965] L.L.R. 9, (Lagos Law Report).

chlorpromazine hydrochloride. This patent was consequently registered in July 1957 in Nigeria under the 1925 Patent Ordinance (Cap. 182) as Patent No. 367 with the second plaintiff as the exclusive licensee. The second plaintiff, May and Baker was a subsidiary of the first plaintiff and had been engaged in the sale and distribution of the product chlorpromazine which it has been selling under the name "Largactil". The defendant, on the other hand, is an indigenous Nigerian enterprise engaged in the importation and distribution of poisonous and dangerous drugs.

It does appear that three main factors could have been responsible for this case. The first factor is the nature of the defendant's business which is importation and distribution of drugs in the country. The second and more crucial factor is the commercial success of the first plaintiff's invention which as already indicated is sold under the trade name of "Largactil". This drug was said to be "widely sold and used in Nigeria and has acquired very wide and good reputation".[37] Consequently, the defendant's desired to partake of the commercial success of this product. The importation into and sale of the latter by the defendant in the country obviously infringed the plaintiffs' patent right. Thus the infringement suit. Finally, it would also appear that, the determination of the Nigerian government during that period to engage the services of indigenous enterprises more than foreign enterprises where the former were believed to have the capability of performing almost the same services also contributed to the commencement of this suit. As a result of this determination

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37. See Rhone-Poulence and Anor. v Lodeka Pharmacy Ltd., op cit., pl0

the government engaged the defendants, instead of the second plaintiffs who were the exclusive licensees for the sale and distribution of the product in question in the country, to supply the products, the subject-matter of the suit, to the Federal Ministry of Health.

The facts of the case are that the defendant in 1964, in breach of the plaintiffs' patent, supplied to the Federal Ministry of Health 250,000 tablets of Chlorpromazine hydrochloride in bottles bearing its labels, and had received a further order from the same Ministry to supply a considerable quantity of the drug which it had agreed to execute. Furthermore, the defendant was alleged to have displayed the same drug at its stand in an exhibition of Pharmaceutical Industry at the Federal Palace Hotel in Lagos in April 1964.

The plaintiffs commenced this action to restrain the defendant from infringing their rights and in the meantime applied for an interim injunction to restrain further breaches pending the determination of the action. The defendant's contention was that while it would amount to an infringement of the plaintiffs' patent rights to distribute the drug to the general public, it could not be so to supply it to the Federal Ministry of Health for use by the public. Consequently, the defendant relied on S.46(1) of the United Kingdom Patents Act, 1949 which provided that:-

> Notwithstanding anything in this Act, any Government department, and any person authorised in writing by a Government department, may make use and exercise any patented invention for the services of the Crown in accordance with the.... provisions of this section.[38]

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38. See the case of Pfizer Corporation v Ministry of Health, L.R. [1965] AC (H.L.) where this section was relied upon and considered.

After determination of the case, Ikpeazu J. held that the U.K. Patents Act, 1949 did not apply in "its totality or as such to this country" and would therefore, not be influenced by S.46(1) of that Act. Though he gave no reason for this holding it would appear, however, that the 1949 Act which came into effect on 1 January 1950 was promulgated after the reception date of 1 January 1900, and, in addition its provisions had not either implicitly or explicitly been extended to Nigeria by the 1925 Patents Registration Ordinance.

The only significant effect the 1949 Act had in Nigeria was in respect of the rights and privileges derivable from the issuance of a Certificate of registration after the registration of a U.K. patent in Nigeria as provided by S.6 of the 1925 Ordinance. The section stated:

> Such certificate of registration shall confer on the applicant privileges and rights to all conditions established by the law of Nigeria as though the patent had been issued in the United Kingdom with an extension to Nigeria.

In respect of the effect of S.6 of the Ordinance vis-a-vis the 1949 Act, Ikpeazu J. held that the registration conferred on a person who registered the patent in Nigeria privileges and rights such as were conferred on the patentee in the U.K. But this, continued his Lordship, "did not mean that the whole Act applied".

His Lordship further held that S.46(1) of the 1949 Act was an express power which the Act specifically conferred on a government department which could operate in diminution of the patentee's rights. And for that limitation to operate in the country the legislature of Nigeria had to make such a provision expressly in favour of the government departments in the country to enable them to

authorise non-patentees or non-licensees to supply patented products. The Nigerian legislature not having done so, the conclusion, according to his Lordship, was that it did not intend that the power should exist. Consequently, an injunction was issued against the defendant.

This case is very significant for three major reasons. First, it brought out quite vividly the limited application of the U.K. Patents Act, 1949 in Nigeria. Secondly, it threw into clear perspective the effect of a registration of a patent under the 1925 Ordinance in Nigeria. Finally, and more important is the fact that it ushered in another stage in the historical development of the patent system of the country which finds expression in the promulgation of the Patents Right (Limitation) Decree No. 8 of 1968.

Patents Rights (Limitation) Decree No. 8 of 1968

The decision in the Rhone-Poulence case did not apparently find favour with the then Federal Military Government, and as a ripost thereto the latter in 1968 enacted the Patents Rights (Limitation) Decree No. 8 to counteract the effect of the said decision. Decree No. 8, the provisions of which have been saved and continued in force by Part II of Schedule 1 of the Patents and Designs Decree, 1970, therefore, did not seek to address itself to the broader problems, such as the costly and cumbersome procedures involved in obtaining a Nigerian patent as well as the disincentive effect on indigenous inventive activity, associated with the 1925 Ordinance.[39] That the Decree instead sought to react to the decision in the Rhone-Poulence case is evidenced by the various provisions thereunder.

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39. For further discussion on this see Chapter Four.

The first of these provisions was Section 1(1). It provided that:

> Where a Commissioner is satisfied that it is in the public interest so to do, he may in respect of an article to which this Decree applies and intended for use in Nigeria, authorise any person including a government department to purchase, make, use, exercise, or vend, as the case may be, any such articles for the service of a government agency in the Federal Republic, anything to the contrary in any enactment or rule of law notwithstanding.

This section was aimed at forestalling a situation similar to that leading to the case of Rhone-Poulence, particularly in respect of the execution of the Federal Ministry of Health's orders by the defendant. It enabled a Commissioner to authorise any person including a government department to exercise the rights or privileges of a patentee in relation to a patented product without unlawfully infringing its rights. This provision corresponded to S.46 (1) of the U.K. Patents Act, 1949 and set the ground on which Government Departments could exercise powers which could operate in diminution of the patentee's rights.

The authority under S.1(1) could be given with respect to any patented article either before or after a patent had been obtained (S.1(2)). It could also be given either before or after the acts in respect of which the authority is given had been done (ibid). This authority "may be given to any person whether or not he is authorised directly or indirectly by the patent holder to make, use, exercise or vend the article" (ibid.). S.1(2) obviously appears to operate to the

considerable detriment of patentees. For example, an act which when committed could be an infringement of a patentee's rights could subsequently be made good by a retrospective authority. Moreover, the section does not define the persons to whom the authority could be given. So that it is even possible for rivals of patentees to be authorised to "infringe" the latters' patents.

Furthermore, the Decree exempted the Government and any person so authorised from liability for the infringement of a patent granted with respect to the article covered by the Decree, or from liability to make any payments whether by way of royalty or otherwise to a patentee or any person deriving title from him (S.1(3)). Similarly, the Decree provided that arrangements between the patentee and any person other than a ministry made after the commencement of the Decree as regards the article was of no effect so far as it restricted its use or provided for the making of payments (S.2). In addition, the Permanent Secretary in the Ministry concerned could merely give the patentee such information as he deemed expedient from time to time concerning the extent of the use of the article.

Special provisions were also made for the use of the power during an emergency to purchase, make, use, exercise and vend the article for any purpose deemed necessary by the Commissioner. The purposes for which this power may be exercised included the efficient prosecution of any war including civil war (S.3(2)) in which the Federal Republic may be engaged,[40] the supply and maintenance of essential services, and the promotion and protection of the economy (S.3(1)).

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40. This provision appears to have been prompted by the Nigerian Civil War (The Biafran War).

The second provision which demonstrates that Decree No. 8 was a response to the judgement in the Rhone-Poulence case was that under S.5(3). It will be recalled that the subject-matter of the suit was the drug sold under the tradename of "Largactil". It was, therefore, no accident or coincidence that S.5(3) which defined the "article" or "article to which this Decree applies" included "any drugs, pharmaceutical preparations, substances or materials..."

The final provision which demonstrates very vividly that the Decree was basically a ripost to the decision in the Rhone-Poulence case was that of S.5(2). It stipulated:

> The Patents Act of the United Kingdom and amendments thereof apply to Nigeria and they shall be read subject to this Decree.

Apart from the fact that the U.K. Patents Act, 1949 was adopted by the Decree as a direct response to the holding that the former did not apply in Nigeria there does not seem to be any other rationale or justification for its adoption. By virtue of S.5(2) the Decree together with the 1925 Ordinance contributed to the deeper incorporation of the Nigerian patent system into that of the U.K. Admittedly, it is difficult to see the usefulness of this, particularly the adoption by S.5(2) of the provisions of the 1949 Act in view of the fact that the latter was structured for a country whose environment and level of industrialisation as well as its level of scientific progress considerably differs from Nigeria's.

Nevertheless, the 1949 U.K. Patents Act was adopted and became operated in Nigeria from 13 March, 1968 when the Decree came into force. In effect the 1949 Act, the Decree and the 1925 Ordinance all contributed to regulate the grant and administration of patents in the

country until 1970 when a new and autonomous patent legislation, which will be discussed in Chapter Six was promulgation for the country.

Conclusion

From the above discussion it is not entirely wrong to infer that the discovery of gold and the gold industry in the then Gold Coast Colony considerably influenced the introduction of the first patent laws for both present Ghana and Nigeria. These laws, as discerned from the above, gave to each of the two countries an autonomous patent system.

However, as a result of the paucity of technical expertise required to operate these independent systems satisfactorily, the Colonial governments of both countries altered the then existing laws and substituted for them new enactments which made them dependent on the U.K. Patents Office for the grant of indigenous patents. In addition, these new enactments successfully incorporated the patent systems of Ghana and Nigeria into the U.K.'s. Surprisingly, as we shall see in the subsequent Chapter, Ghana continues to operate this colonial dependent patent system while Nigeria, on the other hand, as we shall see in Chapter Six, has ceased to operate its colonial patent law and system and has instead enacted its own independent patent law.

CHAPTER 4

THE GHANAIAN PATENT SYSTEM AND THE TRANSFER OF TECHNOLOGY: LAW

Introduction

Ghana, unlike most developing countries including Nigeria which also experienced colonial rule, still operates a colonial patent system. By this we mean that the country still uses the colonial patent law and system of merely registering the inventions already registered in metropolitan Britain both of which it continued after independence in 1957.

The patent system of present Ghana is governed by the Patents Registration Ordinance of 1925, Cap. 179, as amended[1], and the Patents Registration (Amendment) Decree 1972, NRCD 81 which

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1. Cap. 179 is amended by Patents Registration (Amendment) Ordinance, 1933, the Patents Registration (Amendment) Ordinance, 1956, and the Ordinances Extension Ordinance, 1935. The 1933 and 1956 Ordinances (both by their sections 2) merely add the following words "of this Ordinance" to the last word of S.8 of Cap. 179, thus, relating the said section to the said Cap. 179. The 1956 Ordinance, however, goes further to assign to the expression "priority date" in its application to a patent in the U.K. the same meaning assigned to it in the U.K. Patents Act, 1949. On the other hand, the 1935 Ordinance (by S.2) sought to extend Cap. 179, like all other ordinances to the whole of the Gold Coast, i.e. extending the Ordinances of the Gold Coast Colony to the Ashanti and Northern Territories as one single territory. It is important to note that apart from the above mentioned changes these ordinances did not fundamentally alter the patent system as established by Cap. 179.

essentially excludes pharmaceutical products from patentability. Cap. 179 replaced the Patent Ordinance of 1899 which, as we saw earlier on, created an almost autonomous patent system. The latter, as has already been noted in Chapter Three, made adequate provisions for applications and application procedures for obtaining patent grants in the then Gold Coast without any recourse to the U.K. Patent Office. In effect, it provided comprehensive provisions for the internal grant and control of patents. This autonomous system operated for about two and half decades. The NRCD81, on the other hand, as we will see in due course, is a direct ripost to the judgement in the case of Rhone-Poulence S.A. and another v The Ghana National Trading Corporation ([1972] 2GLR, 109).

The introduction of Cap. 179 which, as observed earlier, could be attributed to the paucity of skilled personnel and patents which were filed during the operation of the earlier ordinance of 1899 resulted in a major departure from the patent system previously in force. The former effectively determined the autonomous patent system established by the latter, and has succeeded in incorporating the country's system into that of the U.K. and rendered the former's patent office a mere registration centre for U.K. patents.

CAP. 179

On the whole Cap. 179, as will be discerned from the discussion that follows, does not effectively contribute to the domestic technological development of Ghana. Because of the cost and tedium involved in obtaining a Ghanaian patent, it does not in particular encourage indigenous domestic inventive activity, but due to the fact that it allows the automatic registration of U.K. patents in the country, it enables the influx of inventions which may not be of any technological significance to the country.

The major provisions of Cap. 179 are those relating to the application for registration of U.K. patents in Ghana (G. Coast) and the effects of the registration of such patents.

Application for Registration of U.K. Patent (S.4)

One of the significant provisions of Cap. 179 is S.4 regarding the applications for patent protection in Ghana which states:

> Any person being the grantee of a patent in the United Kingdom, or any person deriving his right from such grantee by assignment, transmission, or other operation of law, may apply within three years from the date of issue of the patent, to have such patent registered in the Gold Coast.

By virtue of the above provision, and the fact that Cap. 179's repeal of the 1899 Ordinance was accompanied by the total elimination of a true domestic procedure for a patent grant, the conferral of a patent grant in Ghana can only be made to U.K. patent holders or persons deriving their rights from the latter. The application for such a grant shall be made within three years from the date of the issuance of the U.K. patent. This means that any Ghanaian who desires a patent protection for his invention in his country will first of all have to obtain a U.K. patent and thereafter register same in the country within the said three year period. Similarly, non-Ghanaians including other Africans desiring patent protection in Ghana will also have to go through the same process. These provisions are the same as those under S.3 of the then Nigerian Registration of U.K. Patents Ordinance No. 6 of 1925 (Cap. 141).

Other prerequisites for the registration of U.K. patents include the accompaniment of the application by a certified copy of the specification of the U.K. patent, and any drawings if necessary (S.5). In addition, the application must be accompanied by a certificate of the Comptroller-General of the U.K. Patent Office furnishing details of the issue of the patent on such specification (ibid). It is only then that the Registrar will issue a certificate of registration (S.6).

Effect of Registration: Duration and Privileges (S.7)

The legal effects of a registration of a U.K. patent in Ghana and the consequent issue of a certificate of registration is provided by S.7(1) of the Ordinance. It states:

> Such certificate of registration shall confer on the applicant privileges and rights subject to all conditions established by the law of the Gold Coast as though the patent had been issued in the United Kingdom with an extension to the Gold Coast.[2]

This provision and that of S.7 (2) amply demonstrates the effective incorporation of the Ghanaian patent system into that of the U.K. Section 7(2) provides that:

> Privileges and rights so granted shall date from the date of the patent in the United Kingdom, and shall continue in force only so long as the patent remains in force in the United Kingdom...

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2. This provision is very similar to S.6 of the Nigerian patent Registration Ordinance of 1925 (Supra)

As a result of the above provisions, any extension of the original grant will automatically apply to that of the Ghanaian grant. Similarly, the annulment of the former will lead to the determination of the latter. So that the legal effect of a U.K. grant is parallel to that ensuing from registration of the grant in Ghana.

It may also be mentioned, as discerned from the above provisions, that the duration of Ghanaian patents as well as the rights and privileges conferred on patentees by a Ghanaian grant are uniform and of a non-discriminatory nature irrespective of the types of inventions for which they are granted. Any differences in this respect may be explained only in terms of the original U.K. grant.

Some Demerits of Cap.179

The continuation of the Ordinance by successive governments has a number of implications which may appear to have a debilitating effect on indigenous inventive activity and the industrialisation progress of the country as a whole. In addition to the inadequacy of resources and skilled R & D personnel, the expensive and cumbersome procedure involved in obtaining patent protection in Ghana which directly emanates from Cap. 179 instead of encouraging inventive activity may adversely affect such activity, especially for inventors who by the nature of their inventions may require legal protection. This is attributable to the requirement that a Ghanaian seeking a patent protection will first have to secure a U.K. patent before he could procure the Ghanaian grant, and this could be costly and inconvenient.

For a Ghanaian inventor to obtain a Ghanaian patent grant he will, first of all, have to lodge his application in the U.K. which may or may not involve his physical presence. If it does he will need to meet his airfare from Ghana to the U.K. which will probably be in Cedis, the currency of Ghana, and in addition thereto, his board and lodging while there, his patent application fee as well as that for services of either a patent agent or attorney all of which will have to be met in foreign currencies. The significance of all this is fully appreciated when one considers the present foreign exchange restrictions currently in force in the country.[3] Though the author is not aware of any specific instances whereby applications for foreign exchange facilities to enable inventors prosecute patent applications in the U.K. have been turned down it is difficult, in view of government regulations, to foresee the Bank of Ghana approving foreign exchange allocations for such an exercise. In consideration of the fact that foreign currency is scarce in Ghana the discouragement of inventive activity, particularly for those inventors requiring patent protection, is real.

The second negative aspect of Cap. 179 relates to the divergence between the environments and needs of the U.K. and Ghana as well as the dissimilarities in the levels of industrialization between the two

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3. By virtue of present government regulations, apart from government officials on approved official delegations or assignments abroad and those travelling abroad on medical grounds approved by certified government medical practitioners, no one travelling abroad is entitled to any foreign exchange facilities.

countries. All these may render the U.K.'s law on patents especially the subject of patentability not necessarily relevant and adequate for the needs of Ghana. Consequently, inventions that may be considered by the latter to be of immense economic importance and also patentable may not necessarily be considered so in the U.K., and thus denied patent grant. This is believed by some officials at the Registrar-General's Department (RGD), the institution charged with the administration of patents in Ghana, to be the case in respect of two domestic inventions falling under the soap and agriculture industry.[4] All this may, therefore, result in the limited application of such inventions in Ghana due to their non-public disclosure and the desire of their inventors to keep them secret in the absence of any legal protection.

Finally, the 1925 Ordinance permits the wholesale registration and influx into Ghana of patented products of doubtful significance for any meaningful technological and industrial development of the country. Since the Ordinance allows the automatic registration of any invention which has obtained a U.K. patent as long as the relevant conditions for registration in Ghana have been satisfied it is not surprising that inventions one may consider worthless are still registered in the country. For example, on 15 February 1965 Philip Morris Incorporated of the USA registered and obtained a monopoly right for its invention of plastic cigarette container in Ghana. Obviously, this invention has very little contribution to make to the development of I.T.C. in particular and the economic development of the country in general. Plastic cigarette containers are products which almost all the plastics industries in the country can produce without much difficulty. Yet Philip Morris Incorporated has acquired

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4. Interview with Senior Officials at the RGD, Accra, October 1984.

a patent right for it and can, therefore, legally prevent any local firm from manufacturing it without its consent.

All this makes incomprehensible the continued application of the Ordinance from the date of independence to the present. It is equally surprising that in spite of the varying characters of the country's regimes between these periods the Ordinance still stands unabrogated. It is instructive to note that an opportunity which arose in 1972 and which could have been capitalized on to determine the Ordinance was not used to the full and the latter, besides some amendments made to it (see NRCD81 below), therefore, still has legal effect in the country.

Rhone-Poulence S.A. and another V Ghana National Trading Corporation

A development in the patent system of Ghana which could have triggered off significant changes in the patent law of that country is the 1972 patent infringement suit between a foreign company and a national commercial institution. This is the case of Rhone-Poulence s.a. and another v The Ghana National Trading Corporation (GNTC). This case is important for a number of reasons. First, it shows how MNCs are able to use patent infringement proceedings to maintain their monopoly, including import monopoly privileges, over their patented products. Moreover, it provided the opportunity, which, disappointingly, was not sufficiently utilized, to revise the entire patent law and system of Ghana. Finally, the decision of this case resulted in some changes in the country's patent law, the most important of which is the exclusion from patentability of all pharmaceutical products.

The case itself seems to be rooted in (1) the commercial operation of the defendant which imported and traded in all kinds of goods and commodities including pharmaceutical products, and (2) more importantly the remarkable commercial success of the subject-matter of the suit, a drug called metronidazole. As confirmed by the plaintiffs, this drug "has been an outstanding success since its introduction on the market in 1960, and until the introduction in 1969 of a chemically related substance, called nitrimidazine, metronidazole was the only product effective for the oral treatment of vaginal trichomoniasis" (cited in Rhone-Poulence S.a v G.N.T.C. at p.113). Even after 1969, the drug has been, and still is, extremely useful in treating many infections. This drug, apparently, since its introduction in Ghana, has been very popular and has had a very good market for a considerable period of time. It is, therefore, not surprising that the defendant desired to participate in its Ghanaian market. It is this desire of the defendant to break the second plaintiff's monopoly control over the sale of the drug in the country which led to this suit.

It may also be mentioned here that another factor which contributed to the commencement of the entire proceedings, as emerged in the course of the suit, was the prior and repeated infringement by the defendant of plaintiffs' Ghana Patent No. 288 which is in respect of the product called chlorpromazine. This product is manufactured and sold by the second plaintiff under the registered trademark "Largactil". It is in fact the infringement of their rights in this product of which they were initially aware, and accordingly they wrote to the defendant to stop any further infringement thereof. However, after the defendent had ignored their letter and commenced the

infringement of their rights in another product, that is the metronidazole, covered by the Ghana Patent No. 522 they had no hesitation in commencing this suit.

The first plaintiff was the owner of the U.K. Patent No. 836854. This patent was sealed in the U.K. Patent Office on 20 September 1960, and it covered an invention entitled the "New imidazole derivatives and processes for their preparations". The said patent was subsequently registered in Ghana under Cap. 179 as Patent No. 522 and dated 18 October 1962. The second plaintiff (May and Baker) was a manufacturer registered in Ghana as an external company dealing mostly in pharmacutical and medical preparations, and was the exclusive licensee and wholly owned subsidiary of the first plaintiff in respect of the said patent in Ghana. The defendant, on the other hand, is a statutory corporation set up by the Ghana National Trading Corporation Instrument, 1965 (L.I. 395), which trades in all kinds of goods and commodities encompassing every conceivable provision.

In this case the plaintiff applied for an interim injunction to restrain the defendant from infringing their patent rights in respect of the Ghana Patent No. 522 and from offering for sale a drug called metronidazole - one of the imidazole derivatives covered by the patent and the product involved in the infringement suit - which is manufactured and sold by the second plaintiff in Ghana and other parts of the world under the trade name "Flagyl". The defendant's contention was that it received the product in question from its manufacturer-supplier, called International Generics Limited of London, for sale in the country, and consequently could not be held responsible for any infringement.

After the determination of the case, Abban J. held that where a patent has been granted in Ghana for processing a particular product,

the importation from abroad and the sale in Ghana of that product made according to the patented process by a person who is neither the patentee nor the licensee of the latter is an infringement. Accordingly, the court granted the application of the plaintiffs and restrained the defendant from infringing the Ghana Patent No. 522 pending the further order of the court.

Another interesting holding of the court related to the applicability of the U.K. Patent Act 1949 in Ghana. In this respect the court held that the U.K. Patents Act 1949 did not apply to Ghana. Though the court reasoned that the Act which consolidated the Patent and Design Acts 1907-1949 was not a statute of general application, its non-applicability to the country can rightly be explained by the fact that it was passed after the reception date of 1876. Moreover, as pointed out by the court, there was no evidence that its provisions had been adopted by the country's legislature.

There are three interesting similarities between this case and the Nigerian case of Rhone-Poulence and another v Lodeka Pharmacy Ltd. (Supra) that need to be brought out. First, the plaintiffs in both cases are the same MNCs. Secondly, chlorpromazine which is manufactured and sold by the second plaintiff featured in both cases. Though it was the subject in issue in the Nigerian case it also came up prominently in the Ghanaian case. Thirdly, the Ghanaian court like the Nigerian also held that the U.K. Patents Act did not apply to Ghana. Finally, both courts issued injunctions against the defendants which happen to be domestic firms. The significance of the two cases is that they demonstrate how foreign MNCs are able to use infringement suits to prevent LDC indigenous firms from "intruding" into their "territories" and thus retain their import monopoly privileges over their patented products.

The judgment in the case of Rhone-Poulence S.A. and another v G.N.T.C. provided a fertile ground for the Ghanaian government to have a fresh look at the entire patent law and system of the country but this was not to be. Instead of a much broader approach to the patent issue, the prompt government response which was provoked by the judgment far from addressing the Ghanaian patent system in a much broader perspective only sought to counteract the effect of the court's decision. The government's reaction is manifested by the promulgation of the Patents Registration (Amendment) Decree, 1972, NRCD 81. It is interesting to note that the time lag between the date the judgment was delivered and the Decree was promulgated is only one month. This was important in nipping in the bud the effect the judgement might have had on the state corporation. The judgement was delivered on 26 May, 1972, and the Decree promulgated on 28 June 1972.

Patents Registration (Amendment) Decree 1972, NRCD 81

The Patents Registration (Amendment) Decree, 1972 is essentially a response to the decision in the case of Rhone-Poulence S.A. and another v GNTC. The Decree basically seeks to exclude from patentability all pharmaceutical products. S.1(1) of NRCD 81 provides that:

> No application shall be entertained under the Patents Registration Ordinance (Cap. 197) (hereinafter referred to as the Ordinance) in respect of any drug, medicine, or pharmaceutical preparation, substance or material.

In addition, the Decree also effectively and retroactively cancelled

all patent monopoly privileges granted to pharmaceutical products. S.1(2) explicitly stated:

> The Registrar-General shall cause to be cancelled every entry in the Register kept under the Ordinance in respect of any drug, medicine, or pharmaceutical preparation, substance or material.

So that from 29 June 1972, the date on which the Decree was promulgated, all pharmaceutical products ceased to qualify for patent protection in Ghana, and in the case of those which, like the metronidazole, have hitherto enjoyed such protection they were, from that date, deprived of any monopoly privilege. All this helped to forestall any adverse effect the decision in the Rhone-Poulence case might have brought on the GNTC. The above provisions, it does appear, have been and are still being strictly enforced.

Clearly, by virtue of S.1 of NRCD 81 the Ghanaian patent law, particularly in respect of pharmaceuticals has since 1972 closely followed those of other LDCs such as India which in 1970 excluded the patentability of drugs and Colombia which after 1971 changed its law again in 1978 with the formal incorporation of Decision 85 of the Andean Pact, thus excluding, among other things, drugs from patent protection. Other LDCs which exclude pharmaceutical products from patentability are the member countries of the African and Malagasy Industrial Property Organisation (OAMPI) which include the Ivory Coast, Senegal, Togo and Burkina Faso. Some LDCs such as Turkey, because of heavy foreign exchange losses and inflated prices of vital drugs (Kirim, 1985), and Brazil exclude from patentability both

pharmaceutical products and processes. Mexican law also excludes pharmaceutical products and processes from patent protection. However, in the case of processes they may be protected under inventor's certificate.

It is imperative to mention another important provision which found its way into NRCD 81, but which does not seem to have been given much effect. This is S.2 which provides that:

> Where the Registrar-General is of the opinion that the registration of a patent under the Ordinance would be contrary to the public interest, he may, after consultation with the Attorney-General, refuse any application in respect thereof and return any fee paid by the applicant.

Obviously, S.2 vests in the Registrar-General a very wide discretion to refuse any patent application if in his opinion it is in the public interest so to do. This provision is very significant since it may permit a selective consideration of patent applications against the background of the objectives which the government may consider to be relevant to the public interest.

However, in contradistinction to S.1 which has been effectively used to refuse registration of patents for pharmaceutical products no application for patent registration has ever been refused on the basis of S.2. This may be attributable to the fact that pharmaceutical products being the prime target of the Decree all efforts are, therefore, directed more to them than any other products. Moreover and equally important is the fact that the present legal structure may

not be an appropriate framework within which the efficacious application of S.2, particularly in terms of the eclectic inflow of foreign technology, can be made. This is because the refusal or conferral of patent grants for inventions of different products may need to be undertaken as part and parcel of an overall technological programme or policy. This may be distinguished from the refusal of a given patent application on the grounds of public morality or legal considerations which may not be difficult to carry out. But when the refusal or acceptance rests on technological developmental considerations then it cannot be accomplished piecemeal but rather in relation to the entire technological programme. Consequently, without such a programme, as in the case of Ghana, the successful application of S.2 will be difficult to achieve.

It may also be mentioned that, in addition to its major objective of excluding pharmaceuticals from patentability NRCD 81, by virtue of S.4, makes a provision for patent fees, an issue over which Cap. 179 was absolutely mute. This is significant in the sense that it has filled in a serious gap in the administration of patents by providing legally enforceable fees which may contribute to meeting some of the administrative expenditure involved in the process of registering patents and issuing certificates of registration for patentees. Disappointingly, however, S.4 subjects all inventions or patents to the same fees without any differentiation on the basis of the dissimilarities in the economic importance of the invention covered by the patent or of the value to the patentee of the national market, a value which may vary from one class of patent to another. Similarly, the chargeable fees do not have any relationship to the industrial sectors into which the inventions fall. It may also be

added that the fees prescribed by S. 4 and those currently charged are so small that they cannot be considered to meet in any reasonable proportion some of the expenditure involved in the administration of patents in the country. All this clearly reveals an absence of any indicators of economic importance which implies that the notion of employing patent fees as an instrument of economic policy with respect to patents is yet to be either accepted or adopted by the country.

The final significant provision of NRCD is that of S.6. It concerns the then pending patent infringement suits brought by foreign patentees against two major state organisations. The first of such suits was the substantive suit which was then pending and brought by Rhone-Poulence against the GNTC. The other suit was that brought by Hoffman La Roche owners of valium and librium - trade names for the drugs diazepam and chloridiaze poxide respectively - against the Ghana Industrial Holding Corporation, Pharmaceutical Division (GIHOC Pharmaceuticals). The latter infringed the plaintiff's patent rights when it commenced production of these drugs. It is instructive to note that while S.1 stultified these infringement suits it is S.6 which effectively and unambiguously ordained the withdrawal of such suits. The section expressly provides that:

> All actions pending immediately before the commencement of this Decree in respect of any matter arising under the Patents Registration Ordinance (Cap. 179) in relation to any drug, medicine, or pharmaceutical preparation, substance or material shall abate on the commencement of this Decree.

Obviously S.6 provided no alternative for these foreign patentees but for the abatement of the actions they had commenced against the above mentioned state organisations. The premature determination of the then pending substantive suit between Rhone-Poulence S.A. and anor. v GNTC by S.6 goes to confirm that the promulgation of NRCD81 was essentially a ripost to the interim judgment in that case.

Though NRCD 81 generally has the merit of narrowing down the unregulated monopoly privileges provided by Cap. 179 by excluding pharmaceuticals from such privileges it does not, together with the latter, provide for the country an adequate patent law. Taken together Cap. 179 and NRCD 81 do not seem to constitute a comprehensive patent regime, and stand far apart from the modern patent law which may have the potential of serving as a spur to indigenous inventive activity, innovation and technology transfer. It may also be mentioned that the two pieces of legislations do not contain any patent-abuse-checking measures such as compulsory licensing revocation and forfeiture to deal with patent abuses including non-working.

Not surprisingly, the present patent regime, as already hinted and as will be clearly discussed in the next chapter, has not, inter alia, been able to afford the country the benefits that the patent system is generally believed to give. In addition to the other functions of the system (See Chapter 1) the present regime has not succeeded, to any reasonable degree, in transferring technology effectively to the country. In fact, it has been used by patentees, as we shall see in the next chapter, to impede the efficacious technology transfer to the country through the inclusion of anti-competitive practices in their licensing and investment transactions.

It is in this respect that a legal regime for the regulation of such technology transfer transactions including FDIs becomes very crucial if the effects of the inadequacies of the patent regime are to be minimized.

Technology Transfer Regime in Ghana

Technology transfer regulation in Ghana is a novel art, and can rightly be considered to be in its embroynic stage. Nevertheless, with the current enthusiasm on the subject, it may not be very long before a meaningful and effective control of the inflow of foreign technology into the country will become a reality.

Historical Development

In spite of the fact that anticompetitive practices, particularly in respect of the transfer of technology, have been practised in Ghana ever since independence in 1957 it was not until recently that the basis to deal with this phenomenon was laid by the Constitutent Assembly which was charged with the drafting of the third Republic's constitution.

The absence of the regulation of these anticompetitive practices may be attributable to the style of industrialization initiated after Ghana became independent and practised until very recently. This style of industrialization has as its primary aim the production of finished goods for domestic consumption. It put emphasis on importation of both technology and raw materials suited to the former.

The most significant feature that characterised this style of industrialization is the overwhelming emphasis which was put on inexpensive imported technology which was usually brought in project packages. On the contrary, this style of industrialisation as practised in Ghana did not, in spite of its significance, accord equal importance to the technology acquisition considerations which inclu de the terms and conditions under which technology is acquired.

All this may be a reflection of the total absence of a concrete and coherent technology policy during that period. It may be mentioned that despite the efforts initiated during the third Republic there are not at the moment any integrated technology policies of either a general or sectoral nature. It is, therefore, not surprising that there have not up till now been any regulations over the terms and conditions under which technology is acquired. This, clearly, is an unfortunate shortcoming in the technology acquisition process of Ghana because such terms and conditions have a considerable effect on the development of indigenous technological capabilities.

However, after more than two decades of unprogrammed imports of technology there has now been an increasing awareness and need for a sound technology programme as well as the need to regulate the terms and conditions of technology brought into the country. The Constituent Assembly which was charged with the responsibility of

drafting the constitution of the third Republic seemed to have taken cognisance of this development which is reflected in the 1979 Constitution of the said Republic.

In order to streamline the science and technology policies and programmes of the country Article 73(4)(a) of the third Republic's constitution provided for the establishment of the National Development Commission, the functions of which, inter alia, is to study and make "recommendations on the contribution of agriculture, industry and science and technology in general to the national development...". Within this Commission, which was set up after the Constitution had come into force, is the Science and Technology Sector Committee, the wing of the Commission responsible for science and technology policies. The Committee is the main body responsible for the country's strategy for technological development and has been advocating for policies in that respect. For instance, in its 1981 Report the Committee among other measures advocated for the "selective and controlled importation of science and technology". It is part of all this, that is, the need to regulate technology transfer contracts and more influentially to attract foreign investments in Ghana that culminated in the promulgation of the Investment Code, 1981, Act 437 and the establishment of the Ghana Investments Centre.

Investment Code 1981 (Act 437) and the Ghana Investments Centre

The Investment Code, 1981 (Act 437) by S.1 established the Ghana Investment Centre (GIC), the body responsible for the regulation of technology transactions and the general administration of the Code. Act 437 consolidated and re-enacted the then existing legislation relating to investments in Ghana such as the Capital Investments

Decree, 1973 (NRCD 14) and the Investment Policy Decree, 1975 (NRCD 329) with such amendments as to attract large-scale investments in the country.

Until 1981 when the Code was enacted there was no centralised effort to regulate the inflow of technology. Hitherto, action in this respect has been undertaken on a sectoral and ad hoc basis, and earlier legislation has essentially been concerned generally with foreign investments and especially the foreign exchange aspect of the investment transaction as noted earlier. The Code which covered a broad spectrum of activities pertaining to the promotion and regulation of investments sought to rectify this practice by including the technology element involved in the investment package.

It is instructive to note that the approval and registration of technology transfer contracts relating to investments in Ghana was only one of the twelve clearly spelt out functions of the Centre (See S.10). Generally, in deciding to process or approve of investments, the Centre had to have regard to the potential of the investment to contribute to the importation at reasonable cost and transfer of technology and technical skills to and absorption thereof by Ghanaians (S.11). These criteria for investments approval are very crucial since they are directed towards the acquisition and absorption of the necessary foreign technology by nationals.

So far as the regulation of technology transfer is concerned S.10(2)(k) vested in the Centre the power to "approve and register all technology transfer contracts relating to investments in Ghana". The main provision of the Code which dealt with approval and registration of technology transfer contracts is S.29. The raison d'etre of this section, it will appear, was to depart from the entire practice whereby

approval of especially foreign investments was confined to the foreign exchange element and to realise the important aspect of the investment, that is, the meaningful and effective transfer of the technology involved in the transaction.

The provisions of S.29 are as follows:

(1) The Centre shall have power to approve and shall also maintain a register of all technology transfer contracts in Ghana.

(2) Regulations made under Section 41 of this Code may prescribe -

(a) that a technology transfer is invalid if not registered under this section;

(b) the form of application for approval and registration under this section and the particulars and documents to be submitted with each application;

(c) the fees to be paid in respect of any application, approval or registration;

(d) the circumstances in which an application must be refused;

(e) appeals from the refusal of an application;

(f) any other matter that appears to the Centre to be reasonably necessary to be prescribed in relation thereto.

S.29 clearly prepared the grounds for controlling the inflow of all technology into the country which could encompass the exclusion of the prevalent restrictive practices which still take place in technology transactions involving enterprises in the country. It is regrettable

to note, however, that so far the regulations called for in S.41 of the Code were not made up till the time the Code was repealed on 17 July 1985. The Centre did not, therefore, during the period the Code was in force, have any legal coherent criteria and methodology for the evaluation, screening, ratification and registration of technology transfer agreements.

The continuing absence of these regulations as well as the general reservations made about the Code and the political climate that followed its enactment (See the next Chapter for discussion on these) did not only affect the functions of the Centre which included the regulation of the transfer of technology, but also the entire operation of the Code. This naturally necessitated a second look at the Code by the government of the Provisional National Defence Council (P.N.D.C.) which has culminated in a new Investment Code.

Investment Code, 1985, P.N.D.C.L. 116

P.N.D.C.L. 116 is essentially a revised version of its predecessor, Act 437. The revision process took, inter alia, the form of public debates which involved quite a number of Ghanaians from all walks of life. Finally, the new draft code was presented and defended by senior officials of the GIC set up by Act 437 before a panel of Ghanaian economists, lawyers and other professionals. After the entire revision exercise the new investment code was promulgated on 17 July 1985.

The Ghana Investments Centre (GIC)

The new investments code, P.N.D.C.L. 116, by S.1 re-establishes the Ghana Investments Centre (GIC) which is to be responsible for

encouraging, promoting and co-ordinating investments in the Ghanaian economy. It is to be headed by a Chief Executive responsible for its day-to-day administration and the implementation of its Board's decisions (S.6(2)). The Board shall be the main governing body of the GIC and shall be responsible for the discharge of the business and functions of the Centre. It shall consist of a Chairman and six other persons, including a Vice-Chairman and a Chief Executive all of whom shall be appointed by the government (the PNDC) taking into consideration their sound knowledge or practical experience of matters pertaining to investments in Ghana, or both.

An interesting and useful provision relating to deliberations of the Board is provided by S.4(4). This section vests in the Board a discretion to co-opt any person to act as adviser at any meeting of the Board. Though any person so co-opted shall not have the right to vote on any matter coming before the Board for decision, the provision is still significant for the fact that it will enable the Board to avail itself of the expertise of any person which may be relevant and useful to issues that come before it. A similar useful provision is that of S.5 which provides that "the Board may for the discharge of the functions of the Centre appoint Committees of the Board comprising members of the Board or non-members or both and may assign to them such functions as the Board may determine". This provision equally makes available to the Board skills which it may lack.

The GIC and its Functions

The Code assigns to the GIC a wide spectrum of functions relating to both foreign and domestic investment activities within the

country (See S.2). Among these are (i) the collection, collation, analysis and dissemination of information about investment opportunities and sources of investment capital, and the advice upon request, on the availability, choice or suitability of partners in joint venture projects, (ii) the identification of specific projects and invitation of interested investors for the implementation of such projects, (iii) the granting of approvals for the establishment of enterprises as specified under the Code, and (iv) the monitoring and enforcement of compliance with the terms and conditions of approvals granted under this Code. In addition to all this the GIC is also "to approve and keep record of all technology transfer agreements relating to investments under this Code"[6] (S.2(i)).

It is significant, because of the intertwining of the issues of the transfer of technology and foreign investment, that the Code dovetails the regulation of technology transfers into the entire investment regulatory functions of the GIC. This approach which is similar to the Andean Pact's (see Decision 24) has the merit of enabling the GIC to adopt a more comprehensive approach to the issue of controlling technology transfer which is after all an integral part of the subject of foreign investments. In this way it may be possible to examine, in correlation, the components or subjects relating to the whole investment package, such as the relevance of the project

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6. This Code does not cover investment activities relating to both petroleum and mineral industries. In the case of the petroleum industry it is governed by the Petroleum (Exploration and Production) Law, 1984 (P.N.D.C. Law 84) while a different law is to be promulgated for investment activities concerning mineral exploitation.

involved to the entire national economy, the foreign exchange element involved, the suitability of the technology and the relevant provisions to ensure its efficacious absorption and possible adaptation. It may be mentioned, however, that the ability of the Centre to accomplish this will depend on whether it has all the necessary expertise to undertake the required thorough examination of the above issues and whether some of these issues may not be over-emphasised to the detriment of the others. In the event that the Centre should lack expertise to examine some aspects of the entire investment project it may seem reasonable to assign such aspects to other institutions best suited for that purpose. The other alternative will be to ensure that such expertise is made easily available to the Centre. It may also seem reasonable that the various issues are given equal and adequate attention so that the technology transfer aspect is not relegated to a secondary place in the examination process.

The GIC and Technology Transfer Regulation

The examination and approval of all technology transfer agreements in the country (see footnote 6) are entrusted to the GIC. This is governed by Part V of P.N.C.D.L. 116. According to S.40(1):

> Technology Transfer Agreement means any agreement relating to an enterprise approved under this Code involving:-
>
> (a) the assignment, sale and use of foreign patents, trademarks or other industrial property rights;
>
> (b) the supply of foreign technical know-how or technological knowledge;

(c) foreign technical assistance, design and engineering, consultancy or other technical services in whatever form they may be supplied;

(d) foreign managerial, marketing or other services:

provided however that an agreement shall not be regarded as a technology transfer agreement for the purposes of this Code if its duration does not exceed a period of eighteen months.

It will be noticed that the above definition does not include agreements covering plant, machinery and equipment which epitomize embodied technology. Consequently, agreements covering the sale or import into the country of hardware technology involving enterprises approved under the Code may not be subjected to any examination by the GIC. This means that the inclusion of any restrictive practices in such agreements is likely to go unchecked, and this certainly represents a major shortcoming of the Code.

For the proper regulation and monitoring of technology transfer transactions the GIC must maintain a record of all technology transfer agreements, including amendments thereto (S.27(1)). In this respect all technology transfer agreements concluded and in force in relation to a Ghanaian enterprise before the commencement of the Code are to be submitted by the parties to the GIC within a period of six months of the commencement of the Code (S.29(1)). In addition, a record of all amendments to such agreements must also be maintained by the Centre, and no such agreements may be renewed without its approval. Moreover, the Centre may advise the parties regarding any existing technology transfer agreements, particularly as to the suitability of the technology and the level of remuneration for the transfer (S.29(4)).

In the case of an approved enterprise[7] where there is involved a technology transfer agreement the GIC shall evaluate such agreement, advise the investor with regard to the choice and suitability of technology, and monitor and ensure compliance with the terms and conditions of such agreement (S.27(2)). These functions are very significant and represent a major departure from the earlier approach where the foreign exchange element used to be the main consideration in respect of foreign investments in the country (Supra). Through the process of approving enterprises intending to invest in the country, and evaluating and monitoring related approved technology transfer contracts at the same time the Centre is, thus, seeking to identify the technology element of the investment package and to ensure its effective transfer to the country.

Where a technology transfer agreement has been approved by the GIC, a certificate of such approval is issued to the approved enterprise. Without this approval, no such agreement relating to enterprise requiring the ratification of the Centre shall come into effect (S.28(2)). This means that any such agreement may be invalid and cannot be enforced in the courts. The effect of non-approval under the Ghanaian law which is similar to the Mexican (See Art. 11 of the Law on the Control and Registration Transfer of Technology, 16 Dec

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7. S.40(1) defines an "approved enterprise" as "an enterprise to which approval has been granted by the Centre under this Code". And enterprise is defined as "an industry, project, undertaking, or business or an enlargement of any such industry, undertaking, project or business, or any part of any such industry, undertaking, project or business".

1981) is more far-reaching than, as we shall see in Chapter 6, the Nigerian where the only sanction attached to the non-approval of technology transfer agreement is the denial of foreign exchange transfers by Nigerian Banks in favour of technology suppliers.

An important provision of the Code which seeks to address the question of restrictive practices involved in technology transfer transactions, which as the next chapter will reveal are still in vogue in Ghana, is S.30. It provides that:

> The Board may make regulations in respect of any of the following:
>
> (a) criteria for the approval of technology transfer agreements;
>
> (b) remuneration for technology transfer and reasonableness of fees;
>
> (c) reasonableness of duration of agreement;
>
> (d) restrictive business practices;
>
> (e) transfer and absorption of technology;
>
> (f) form and procedure for approval and monitoring of technology transfer agreements;
>
> (g) any other matter relating to technology transfer agreements that appear to the Centre to be reasonably necessary.

S.30 gives the Board a discretion to make regulations to enable the GIC to adopt an uniform and coherent criteria in its functions of ratifying technology transfer contracts as well as combatting anticompetitive practices in such agreements. With the benefit of hindsight, that is, the non-adoption of any such regulation by the Centre as called for by the preceding Code (i.e. Investments Code,

1981) and despite the fact that it was given the discretion to adopt one (Supra) it will seem appropriate to have made the adoption of these regulations mandatory on the Board. Nevertheless, with the current enthusiasm for controlling the transfer of technology into the country it is hoped that the Board will adopt the appropriate regulations called for by S.30. At the time of writing some guidelines of a sort have been presented to the Centre by an expert from the UN Centre for Transnational Corporations (UNCTC) which may assist it in formulating the regulations. These guidelines cover issues such as criteria for approval of technology transfer contracts, remuneration for technology, duration of contracts, prohibition of restrictive practices, confidentiality obligation, training of Ghanaians, and application and procedures.

Part V of the Code reinforces the spirit of the preceding Code which is the centralisation, apart from the petroleum and mineral industries, of investments and technology transfer regulations under one institution. The effective execution of the Code and the adoption of the necessary legally enforceable regulations backed by an adequate monitoring system may ensure the expunction of the prevalent anti-competitive practices in technology transfer transactions and the possible efficacious transfer and absorption of technology by indigenous Ghanaians. It may be mentioned that despite some of its major shortcomings, such as the exclusion from examination by the GIC of hardware technology transfer agreements and others not covered by the study P.N.D.C.L. 116 appears to be an improvement on earlier laws relating to regulations of investment activities as well as the transfer of technology.

Conclusion

It is clear from the above that Ghana has no autonomous and comprehensive patent law of its own and still operates a colonial ordinance which was amended in 1972 to exclude pharmaceutical products from patentability. The operation of this ordinance as we endeavoured to demonstrate could, in addition to other factors such as inadequate resources for R & D and R & D engineers and scientists (see next chapter), hinder indigenous inventive activity. Moreover, the lack of any provisions to check patent abuses including non-working could also affect the role of the Ghanaian patent system in transferring technology to the country.

It may also be added that the inadequacies of the patent system, as will become clearer in Chapter 5, are exploited by patentees to impose on Ghanaian enterprises anti-competitive practices. It is in this respect that the enactment of Act 437, the first Investments Code, was significant. However, the non-adoption of the relevant regulations, among others, did not enable the GIC set up under that Act to function successfully. The promulgation of the P.N.D.C.L. 116 is, therefore, seen as an attempt to rectify the then existing situation. P.N.D.C.L. 116 re-establishes the GIC and entrusts it with the power to promote and regulate investments in the country. Furthermore, it is, at the same time, empowered to regulate technology transfer agreements which is quite meritorious in view of the interrelation between the transfer of technology and foreign investments. It is hoped that the regulations called for by S.30 will be made as early as possible so as to arm the GIC to undertake the thorough regulation of technology transfer transactions in the country.

Though P.N.D.C.L. 116 was recently promulgated (i.e. July 1985) and this makes it difficult to assess its effect on the regulation of the transfer of technology it may be possible to evaluate the results of the other enactments. Accordingly, we shall, in the next chapter, examine the impact of Cap. 179 and N.R.C.D. 81 on patenting activity in and the transfer of technology to Ghana and that of Act 437 on technology transfer regulation.

CHAPTER 5

THE GHANAIAN PATENT SYSTEM AND TECHNOLOGY TRANSFER: PRACTICE

Introduction

It will be recalled that Cap. 179 and NRCD 81 are the main legislation which govern the administration of patents in Ghana. The former has been in force for a period of 60 years and the latter over 13 years. We shall, in this chapter, endeavour to ascertain both their individual and combined effects on patenting activity in and the transfer of technology to the country. Similarly, we shall also examine how far the technology transfer regimes as well as related governmental policies and institutions have been able to contribute to a genuine and effective technology transfer to Ghana.

Cap. 179 and Patenting Activity

It does appear that besides other factors such as the paucity of R & D resources and skilled technical and scientific personnel Cap. 179 has considerably contributed to the dearth of domestic inventive and patenting activities by Ghanaian inventors. By virtue of Cap. 179, as has already been mentioned in the preceding chapter, every Ghanaian inventor who desires a Ghanaian patent for his invention must first of all obtain a U.K. patent grant for it and thereafter apply for the registration of the latter in Ghana. It is only after going through this process that one can obtain a Ghanaian patent grant. This process, as explained in Chapter Four, could be costly and tedious and it is this cost and tedium which have contributed to preventing a number of indigenous inventors from applying for and obtaining patent grants for their inventions.

Among the inventions for which patent protection has been sought from the Registrar-General's Department (RGD) - the department in charge of the administration of patents in Ghana - but for which none could be procured because of the said cost and tedium include a camera made out of a small sized kerosene can. This camera, it is believed, was once used in taking a snap of the inventor and the late Prime Minister of the second Republic of Ghana[1]. However, because the former, a poor technician, could not in particular afford to meet the expenses involved in obtaining a U.K. grant his invention has not up till now been subjected to any test of patentability[2]. Consequently, no patent grant for it has been made. The most recent indigenous inventions which have not up to date received any Ghanaian patent, particularly because of the cumbersome procedure which is inherent in Cap. 179 (Supra), include a machine and the process for making burnt bricks on site developed by the Building and Road Research Institute. Another is the development of a modern television aerial with two antennae by the General Manager of Akasanoma, the electronics division of the Ghana Industrial Holding Corporation (GIHOC)[3].

As confirmed by the RGD most of the inventions for which protection has been sought at the department appear to be economically useful[4]. However, the present patent regime has not made it possible for the RGD to grant patent rights for these inventions. As one official observed, most indigenous inventors who

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1. Interview with an official at the RGD, Accra, October 1984.
2. Same interview.
3. Interview with the Registrar-General, Accra, October 1984.
4. Same interview.

come to enquire about the possible patenting of their inventions always get disappointed when they are told that the RGD could not register their inventions until they have produced evidence of a prior U.K. grant.[5] On the question of the patentability of these inventions the state of the law has left unresolved whether these inventions would be patentable anyway.

A major detrimental effect of all this is that such indigenously developed inventions, most of which are abandoned, do not contribute to providing a source of technical knowledge for further R & D since they invariably die with their inventors. Moreover, they do not contribute to public welfare because they are often not worked which, besides inadequate resources for their exploitation, may be due to the lack of legal protection. It may be argued that inventors of such inventions could proceed to exploit them even without patent grants if they had any merits. This may be true, but the point to be made here is that the patent system of Ghana in its present structure cannot favour the indigenous inventor with the legal protection that the patent system is generally known to give to inventors.

To date there is only one indigenous Ghanaian invention which has so far been registered in the country. This is the "mashing machine" developed by a Ghanaian engineer called Samuel Kwasi Anane. The main function of the invention is for the making of paste, popularly known in West Africa as fufu, from root crops such as yams, cocoyams, cassava, and also plantains after they have been softened by boiling in water. The invention eliminates almost all the traditional laborious process involved in the preparation of this dish.

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5. Interview with an official at the RGD, Accra, October 1984.

The invention comprises a circular bowl with sloping sides and a "central frustoconical-shaped core" into which the food to be treated is placed, two arms, the lower ends of which arms are of similar cross-section to that of the lower part of the circular channel, means for reciprocating the arms in vertical planes into and out of the channel, and means for rotating the bowl relatively to the arms. The whole mechanism is assembled into a compact unit. In operation the products to be pounded or worked, that is, yams, cocoyams, cassava and plantains are placed in the bowl and the mechanism is operated, for instance, by switching on an electric motor, or by turning a wheel by hand. The bowl revolves at only a slow speed of about three to four revolutions per minute. At the same time the arms move with alternating, reciprocating motion into and out of the channel in the lower part of the bowl. The ends of the arms "break up the products placed in the bowl by crashing and squeezing them between their rounded V-shaped ends and the walls of the channel in the bowl which are of similar shape". The material, that is, the flesh of the yam or cassava, is "squeezed out and gradually taken on to the location of the other arm" where the operation is repeated. After a short time "a very homogeneous, well mixed paste is obtained". If desired mixing may be ameliorated by installing one or more "fixed curved blades in the bowl". As the paste in the channel rotates it is forced against the blade and the curvature of the latter causes further mixing.

To secure a Ghanaian patent grant for this invention, Anane after being apprised of the cumbersome procedure by the RGD first travelled to the U.K., engaged the services of a patent agent, one N.F. Baker, who prosecuted the necessary application and eventually procured a patent for the invention there before returning to Ghana to

register the U.K. patent in Accra for the Ghanaian grant. Though Anane obtained a certificate of registration in January 1975 most officials did not, until recently, know that the invention has since then got the Ghanaian registration. This is not surprising since in the Ghanaian Patent Register, the U.K. is recorded as the country of origin of the invention and the inventor himself described not as a Ghanaian but as a British subject. The fact is that Anane eventually managed to get a Ghanaian patent for his invention only after he had obtained a U.K. grant for it and registered the same with the RGD.

The question, however, is did he really need to go through that process at all, and how many other Ghanaian inventors can afford or are prepared to go through the same process? This process which is prescribed by a colonial ordinance is currently most irrelevant and ought to have been laid to rest long ago. It does seem, based on available evidence, that most Ghanaian inventors either cannot afford or are not prepared to go through this process, and the earlier a much simpler mode of obtaining a Ghanaian patent is conceived the better for indigenous inventive activity.

Other consequences of Cap. 179 include the fact that it does permit, as earlier observed, the inflow into the country of patented products or technology of minimal economic significance or none at all. As mentioned above, the wholesale registration of U.K. patents has made possible the registration in the country of an invention such as plastic cigarette containers for which Philip Morris Inc. of U.S.A. has obtained a monopoly right. Finally, the absence of in-built-checks in Cap. 179 against patent abuses as well as non-working account for the fact that most Ghanaian patents are not worked and patent abuses are prevalent (infra).

NRCD 81 and its Effects on Patenting Activity and the Pharmaceutical Industry

NRCD 81 is the other patent enactment which together with Cap. 179 governs the administration of patents in the country. It excludes from patentability pharmaceutical products. On the basis of available evidence, it is clear that the effect of this enactment has been far greater than anticipated. The Decree which is a response to a High Court decision in a patent infringement suit has not only succeeded in freeing the state organisation involved in that suit from the effect of the said decision but has also contributed to a considerable reduction of the total volume of patents registered in the country, and more importantly to an increased direct participation of foreign patentees in the domestic pharmaceutical industry.

The coming into effect of NRCD 81 accounted, to a considerable extent, for the significant reduction in the scale of patenting activity in the country. As table 5.1 illustrates, pharmaceutical inventions, before their exclusion, constituted a very great proportion of all inventions for which patents are registered in Ghana. For example, in 1970 pharmaceutical inventions alone constituted over 52 per cent of all inventions registered in that country. Consequently, with their withdrawal from registration it is no surprise that the total volume of inventions for which patents were sought, as demonstrated by table 5.2, waned from the period the Decree came into force.

It may be added, however, that the content of patent legislation is only one of a set of factors that are likely to influence the size and nature of patenting in a given period and in a given country.

With this in the background we should remember that there may be other factors which could be responsible for this reduction. However, the sudden drop in the total volume in patent applications immediately after the promulgation of the Decree suggests that it is an important factor which explains this development.

Table 5.1

Year of Patent Grant	Total Patents Granted	Number of Pharmaceuticals, drugs and medicines	Percentage of Pharmaceuticals, drugs & medicine
1965	75	36*	48%
1966	76	21	27.63%
1967	80	27	33.75 5
1968	62	23	37.09%
1969	70	13	18.57%
1970	80	42	52.5%
1971	97	43	44.32%
1972	62	17	27.41%

Source: Based on information provided by the Registrar-General's Department, Accra, Ghana

Note: * = approximation

The other crucial consequence of the promulgation of NRCD 81 is the sudden direct participation by foreign pharmaceutical companies, most of which were patentees of various pharmaceutical inventions, in

the domestic pharmaceutical industry. In line with popularly held opinion and the empirical evidence presented in Chapter One that the pharmaceutical industry is very sensitive to patent protection one would have expected that the abrogation of protection for pharmaceuticals would have been discouraged, and thus led to a complete decline in the number of foreign pharmaceutical firms undertaking any investment in the country. However, the contrary seems to have been the case. It is instructive to note that before NRCD 81 most foreign patentees of pharmaceutical products hardly exploited their inventions in the country. Instead, their patents were utilized solely for the importation of their products into the country by their respective agents.

Nevertheless, after NRCD 81 had effectively cancelled and withdrawn all patent monopoly privileges for pharmaceuticals a considerable number of foreign patentees commenced domestic working of their inventions in the country, and those which could not, entered into licensing and other manufacturing arrangements with some of these foreign firms or indigenous pharmaceutical firms to manufacture domestically products over which they used to hold monopoly rights. Among the foreign companies which commenced domestic production of medicines in the country after the introduction of the Decree include Danafco Company Limited and Pharco Laboratories Limited. Hoechst is the latest company which would have started domestic exploitations of their inventions, but as one official remarked, " the recent coup d'etat (1981) threw everything out of gear and we will have to wait a while and start all over again".[6] Others which did not directly invest in the industry but have entered into agreements for the

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6. Interview with an official at Hoechst (Ghana) Ltd., Accra, November, 1984.

domestic manufacture of drugs over which they held Ghanaian patents include Beecham laboratories, whose drugs are manufactured on their behalf by Major & Co (Ghana) Limited, an American company, called A.H. Robbins whose drugs and medicines are manufactured by Pharco Laboratories, and a Danish company, called Dumex whose pharmaceutical inventions are exploited on their behalf by Danafco.

The other foreign companies which entered into contractual arrangements for the domestic production of their drugs include Merck, Sharp and Dhome, and May and Baker. These companies entered into a manufacturing arrangement with the biggest indigenous pharmaceutical firm, GIHOC Pharmaceuticals, which is state owned, for the working of their inventions. It is interesting to note that among the drugs being produced by GIHOC Pharmaceuticals on behalf of May and Baker is Flagyl, the subject-matter of the infringement suit between Rhone-Poulence and Another v the GNTC. These arrangements have, inter alia, necessitated the on-going extension and renovation works currently being undertaken by GIHOC Pharmaceuticals.[7]

Clearly, the period after the abolition of patent protection for pharmaceuticals saw increased foreign investment and participation in the Ghanaian pharmaceutical industry. Though limited in scale it may not be wrong to compare the situation here with the Brazilian where in spite of the fact that from 1969 onwards patent protection for pharmaceuticals as a whole was effectively abolished FDI in the Brazilian pharmaceutical industry still rose, between 1971 and 1979, from $11.4 million to $646.5 million (UNCTAD, 1981, 33). Similarly Kirim's Study on Turkey also reveals that "... even in the absence of

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7. Interview with a top official at GIHOC Pharmaceuticals, Accra, November, 1984.

patent protection in the pharmaceutical industry, the amount of foreign capital investment rose considerably..." (1985, 226). All this appears to suggest that the lack of patent protection does not constitute a discouragement for foreign investments, and that besides patents there may be other compelling factors which are more likely to induce FDI than patent monopoly rights.

The Market Factor

As observed earlier on, the legal guarantee and security provided by patent rights encourage patent and know-how licensing as well as FDI. This, as discerned in Chapter One, applies forcefully to pharmaceuticals. However, paradoxically, the abolition of patent protection for pharmaceuticals in Ghana resulted in increased foreign licensing arrangements and investments in the industry as shown above. This clearly contradicts some of the observations, particularly relating to pharmaceuticals made in Chapter One. It may, therefore, be asked if the abolition of patent monopoly privileges instead of discouraging rather leads to an increased foreign participation in the local pharmaceutical industry, then what other consideration could have contributed to this development?

The abolition of monopoly rights for pharmaceuticals created a no-man's land so far as the Ghanaian market for these products is concerned. This, therefore, made the ground very fertile for piracy in pharmaceutical products in the country which hitherto was on a limited scale. For example, even before the Decree came into effect imitated drugs were finding their way into the Ghanaian market. The case involving Rhone-Poulence and the GNTC is clearly demonstrative of this. The latter was selling in its shops drugs over which the former

held the Ghanaian patent but manufactured by International Generics Limited of London which was neither the patentee nor a licensee of Rhone-Poulence. Similarly, during the same period GIHOC Pharmaceuticals were imitating and producing the drugs called valium and librium for which they held no licence.

It may, therefore, appear that the desire of foreign patentees to forestall, in the absence of legal protection, the possible escalation of pharmaceutical piracy contributed to the subsequent FDIs in the local pharmaceutical industry, and the resultant patent and know-how licensing arrangements between foreign licensors and domestic licencees. Another significant contributory factor in this respect is the determination of foreign patentees to maintain their share of and grip over the Ghanaian market.

That the market consideration is very significant in relation to this development is evidenced by the only licensing and manufacturing agreement the author was able to lay hands on. For example, in that agreement besides the absolute export restriction imposed on the indigenous licensee firm, the agreement went further to share the Ghanaian market between the two parties, that is, the foreign licensor and the local licensee. According to the terms of the agreement, the local firm is responsible for only "the sale to the Government of Ghana and Government Agencies for use in Ghana" of the products manufactured under the agreement while the entire domestic private sector as well as foreign markets are taken over by the foreign party. An interesting aspect of this arrangement is the different labelling and packaging of the same products manufactured by the domestic firm for the two parties. They are done in such a way that one may easily be made to believe that they are manufactured separately by different

firms. This arrangement is important for the foreign party in forstalling the complete erosion of its share of the Ghanaian market. As the General Manager of the local licensee firm remarked, "by this arrangement the foreign party is constantly assured of a foothold in the pharmaceutical industry and, more importantly, the indigenous pharmaceutical market".[8]

It does appear, therefore that the Ghanaian market has served as a better bait for foreign participation in the indigenous pharmaceutical industry than patent protection. This is consistent with Kirim's study (1985) on the abolition of patents and the pharmaceutical industry in Turkey, and the findings of UNCTAD (1981) in a review of recent trends in patents in developing countries.

Having assessed the individual effects of Cap. 179 and NRCD 81 it may now be appropriate to examine their effects on the evolution of patents in Ghana.

Patenting Activity

So far as patenting activity in Ghana is concerned it is predominantly dominated by foreign patentees. As Table 5.2 reveals, there is not a single registered invention, according to the patent register, which originates from the country. However, as mentioned earlier, there is one invention, the mashing machine of which the author is aware was developed locally by a Ghanaian engineer but the U.K. was registered as its country of origin.

Table 5.2 illustrates the domination of patenting activity in Ghana by the industrialised countries. Out of the total volume of

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8. Interview with the General Manager of GIHOC Pharmaceuticals, Accra, November, 1984.

TABLE 5:2
REGISTRATION OF PATENT'S 1940-1985

Countries of Origin	Year of Registration													
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
United Kingdom	24	26	13	6	7	12	8	8	8	4	3	4	3	2
U.S.A.	10	25	12	18	7	14	6	25	9	7	2	5	4	5
West Germany	17	24	15	4	15	9	12	22	14	6	3	2	3	2
Switzerland	14	6	7	-	-	12	11	7	1	4	3	2	2	1
Netherlands	5	-	2	4	-	-	1	2	3	1	-	1	-	-
France	3	1	4	1	-	1	2	3	1	8	2	-	-	1
Italy	1	5	4	2	-	2	2	3	1	-	-	-	-	-
Japan	2	1	-	2	3	2	1	2	-	3	-	2	2	2
Australia	2	-	2	1	-	1	-	-	-	2	2	-	1	-
Belgium	-	2	1	1	2	-	-	-	-	-	1	-	-	-
Canada	-	3	-	3	1	-	-	-	-	1	-	-	-	-
Hungary	-	1	-	-	2	-	-	-	1	1	1	-	-	-
China	-	1	-	-	-	-	-	-	-	-	-	-	-	-
South Africa	2	-	-	-	-	-	-	-	1	-	-	-	-	-
Bahamas	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Poland	-	-	1	-	-	-	-	-	-	-	-	-	1	-
Denmark	-	-	1	-	-	-	-	-	-	-	-	1	-	-
Yugoslavia	-	-	-	-	2	-	-	1	-	-	-	-	-	-
Greece	-	-	-	1	1	-	-	-	-	-	-	-	-	-
Malaya	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Ivory Coast	-	-	-	-	1	-	-	-	-	-	-	-	-	1
Sweden	-	1	-	-	-	-	-	1	-	-	-	-	-	-
Lebanon	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Hong Kong	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Republic of Korea	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Nigeria	-	-	-	-	-	-	-	-	-	-	-	-	2	-
Austria	-	-	-	-	-	-	-	-	-	-	-	-	1	-
TOTAL	80	97	62	44	41	53	43	75	39	37	17	19	19	14

Source: Registrar-General's Department, Accra, Ghana.

inventions registered in the country between 1970 and 1983 they alone accounted for about 95.95 per cent with the U.S. taking 23.28 per cent, followed by West Germany with 23.13 per cent and the U.K. with 20 per cent. These three countries alone account for over 66 per cent of all inventions registered in the country. In contradistinction, the total share of East European countries amounts to only 1.87 per cent and that of the LDCs including Greece stands only at 2.18 per cent. The percentage of all African inventions registered in the country during that period is only 1.09. Clearly, the share of African participation in patenting activity in Ghana is minimal. This may be attributable to the paucity of skilled R & D scientists and engineers in the continent and possibly the difficult and complicated procedure required by the Ghana patent law in securing patent protection in that country. This, therefore, can adversely affect transactions in technology between Ghana and the various African countries.

Industrial Sectors and Registration of Patents

An examination of the inventions registered in the country between 1979 and 1983 (see table 5.3) shows a clear bias in favour of organic chemistry and chemical treatment, for example, disinfection of soil or living plant material; pesticides or herbicides. This is followed by the agricultural sector. It would have been expected that Ghana being an agricultural country would have given priority to inventions coming under the agricultural sector in its grant of monopoly privileges. It must, however, be realised that inventions falling into the category of organic chemistry and chemical treatment

TABLE 5:3
PATENT APPLICATIONS FILED, ARRANGED BY TECHNICAL UNITS BASED ON THE IPC (FOR THE PERIOD COVERING 1979-1983) AND BY COUNTRY OF RESIDENCE

Applicant's Country of Residence	Technical Units																														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
France	4	2										1	2				1			1												
Ivory Coast															1																
W. Germay	1						2	1				1	7	1	1								1							1	
Japan	1											1	3				3											1			
U.S.A.	1					2	1	1		1			7		2		1	1								1				5	
U.K.	1	2	1			1						1	7							2					1						
Switzerland		3			1								8																		
Austria																														1	
Hungary													2																		
Canada																	1														
Netherlands				1														1													
Australia																						2									
Belgium													1																		
							1																								
Hong Kong												1																			
Rep. of Korea																														1	
Nigeria	2																														
Bahamas												1																			
Total	10	7	1	1	1	3	4	2		1		6	37	1	4		6	2		3		2	1		1	1		1		8	

Source: Registrar-General's Department, Accra, Ghana
Note: for interpretation of the table see Annex 1.

which took the lion share of patent grants in the country during the period under consideration service mainly the agricultural industry and therefore very relevant for the latter. Other inventions for which a fair number of patent grants were made cover electricity, foodstuffs and tobacco, chemistry dominated by manufacture of fertilisers and metallurgy.

It is instructive to note that during the period 1979-1983 very limited numbers of inventions were registered in the country for machines or engines and engineering in general. In fact, inventions relating to this sector account for only 1.94 per cent of the total inventions during that period. Even if the number of inventions here are added to that of mechanical metal-working without essentially removing material, punching metal, castings, powder metallurgy and machine tools the percentage share of total inventions still stands at only 5.82. This is crucial in view of the fact that the development of a local machine and capital goods sector is pivotal for the generation and diffusion of technological change (supra). This could be accomplished through the mechanism of the patent system. For a country like Ghana which does not have adequate expertise and resources for the development of this sector it could encourage the inflow of more technical knowledge and investments in this sector through incentives and more favourable patent monopoly privileges until the time that it will be self-reliant. Thereafter, it could start to discourage further inflow by measures including the exclusion of further monopoly privileges for inventions in respect of the sector. In using the grant of patents in this manner Ghana would be employing its patent system as a tool of economic measure.

It is clear from the above that not many inventions relating to the capital goods sector are registered in Ghana. The above

discussion also reveals, in the case of Ghana and confirms in respect of other case studies carried out in the third world, that the majority of domestic patents are owned by foreign patentees. The major concern in this regard is the use to which these foreign dominated grants are put. Instead of being worked domestically they are used to introduce restrictive and anticompetitive practices in patent and technology transfer transactions which adversely affect the inflow of technology into most LDCs including Ghana.

Restrictive Covenants in Technology Transfer Transactions

Available evidence suggests that the inclusion of anticompetitive practices in patent and technology licensing transactions involving Ghanaian licensees still takes place. Among these practices are export prohibitions, tie-in clauses, field of use restriction, unduly-long duration of contracts, no-challenge clauses, restriction on adaptation and excessive controls of licensees' operations.

Table 5:4 manifests foreign jurisdictions clauses as the dominant. It does appear from the agreements studied that these clauses are very common in services agreements. In most cases the contracts are governed by and construed according to the laws of the home countries of the foreign parties, normally the licensors. In the case of arbitration in times of disputes some agreements settled for the arbitration procedure and fora provided by the arbitration laws of the foreign licensors' countries while others adopted international procedure and fora such as those of the International Chamber of Commerce in Paris or other international bodies. It is important to point out in this respect that PNDCL 116 has adopted the United

Nations Commission on International Trade Law for the purposes of such disputes. This, as we shall see in due course, is in contradistinction to the Nigerian approach which adopts Nigerian jurisdiction to govern all investment or technology transfer agreements and disputes settlement.

Table 5:4

Nature and Frequency of Restrictive Clause in Licensing Agreements Between Ghanaian Firms and Overseas MNCs.

Type of Restriction	No. of Agreements embodying restrictive clauses	Percentage of total
1. Foreign Jurisdiction	19	47.5
2. Export Restrictions	13	32.5
3. Tie-in	7	17.5
4. Unduly long duration (10-20 yrs)	5	12.5
5. No challenge clause	2	5
6. Field of use restriction	3	7.5
7. Grant-back (unreciprocal)	1	2.5
8. Restriction on R & D	1	2.5
9. Excessive control of licensee's operation	11	27.5

Source: Based on analysis of 40 agreements provided by the Bank of Ghana.

It is interesting to note that a significant number of the agreements which adopted the Ghanaian jurisdiction to govern agreements and dispute settlements involved small indigenous private enterprises while a good number of government enterprises or firms in which government has interest submitted their agreements and transactions to foreign jurisdictions. This contradicts the popularly held view that because government institutions or enterprises are backed by the State machinery and, thus, have a better bargaining power they are less likely to be inflicted by restrictive practices than private enterprises.

The second most prominent restrictive practice is export prohibition. This restriction is found to be very common in agreements which involve the manufacture of consumer goods and to some extent consumer durables. Almost all the export restriction clauses embodied in the agreements studied are absolute. The only exception is that relating to one agreement involving the garment industry. In this instance, the Ghanaian licensee is permitted to export the products covered by the agreement to some specified West African countries which are Upper Volta (now Burkina Faso), Mali, Ivory Coast, Togo and Dahomey (now Benin). Two of the agreements studied embody a further export restriction which is novel and more restrictive, and is what I refer to as internal market-sharing restriction. In addition to the absolute export prohibition imposed on the Ghanaian licenses, these two agreements, one of which involve a wholly government owned enterprise, went further to divide the licensee's home market between the latter and the licensors. The first of these two agreements relates to the pharmaceutical industry which has already been referred

to (Supra). The other involves the tobacco industry. Under this agreement the foreign licensor's share of the Ghanaian market covered all "sea or air stores for ships or aircrafts engaged in international traffic to or from" Ghana as well as "duty free shops (other than the Duty Free shops at Accra Airport and Ghana Airways) diplomatic corp embassies consular services or international organisations such as the United Nations" which may be located in the country. The remainder of the Ghanaian market was left for the licensee. Thus a further diminution of market for the products of the licensees. It may also be noted again that fully owned government corporations and those in which government has proprietary interest are also victims of export restrictions.

However, as already hinted, export restrictions per se may not necessarily harm Ghanaian enterprises. As observed earlier, it is only when a licensee has the capacity and potential to export if given the chance that such restrictions may or can have adverse effects on its operations. In the case of Ghanaian licensee firms export restrictions may not have much significant impact on their export activities for a number of reasons.

In the first place, as the Economic Recovery Programme 1984-1986 tersely stated:

> A large number of the manufacturing industries in Ghana depend on imported raw materials and spare parts. The import intensity of these industries can be gauged by the fact that in 1979 the imported raw materials accounted for 68 per cent of all raw materials used by the manufacturing industries as a whole. In view of the foreign exchange constraint facing the economy, these industries have been unable to obtain their import requirements of raw materials

> and spare parts to keep their plants operating at reasonably high levels of capacity. Capacity utilization in the sector is estimated at an average of about 30 per cent and it has even fallen as low as 10 per cent for some industries. (1983, 47).[9]

So that as a result of heavy reliance by Ghanaian manufacturing licensee firms on foreign inputs and the domestic foreign exchange constraints which makes it difficult to procure these inputs in reasonable quantities these firms are not in a position to satisfy both their home and foreign markets. The present position in this regard is neatly summed up by the Deputy Managing Director (Operations) of the Ghana Industrial Holding Corporation (GIHOC). In answer to the question whether GIHOC's chain of industries experience export restrictions in its technology transfer transactions he observed that:

> Hardly, do we experience such restrictions in our technology agreements. However, even if we do they may be quite harmless to our operations since we are not always able to procure all required inputs because of foreign exchange problems. Consequently, we have,

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9. Further evidence of the under-capacity industrial production is given by the Secretary of State for Industries, Science and Technology who in his address to the Ghana manufacturers Association in Feb. 1982 estimates that most factories operate "at very uneconomic levels of about 20 per cent full capacity".

> for a considerable period of time, not been able to satisfy the Ghanaian market and this makes it quite unrealistic for us to worry about exports.[10]

Moreover, according to the same document, that is the Economic Recovery Programme 1984-1986, high tariff barriers as well as quantitive import controls and the monopoly enjoyed by some domestic industries have affected their efficiency eventuating in high cost production and production of poor quality goods. Obviously, these industries do not seem to have the potential to export even if given the change. Consequently, export restrictions may not necessarily have any adverse effects on the operations of most Ghanaian licensee firms.

Nevertheless, as has been observed, the presence of export restrictions may in the longer run discourage investments in new production facilities and perhaps render unit costs higher than would otherwise be the case through the restriction of production confined to the allocated market.

The non-prohibition of exports may, therefore, be a necessary if not a sufficient condition for export capabilities of licensee firms. In addition, there may be the need for the institution of other measures and incentives to increase the export potentials and capabilities of indigenous licensees. An attempt in this direction seems to have been made by the Investment Code, 1985. In the first place, the export manufacturing industry has been classified, inter alia, by the Code as "priority areas of investment" entitled to special benefits in addition to the guarantees provided for all enterprises approved under the Code (See part 3 of the Code).

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10. Interview with the Deputy Managing-Director, GHIOC, Accra, November, 1984.

These special benefits available to both new and existing enterprises manufacturing or processing products for exports (See Part 2, S.12(1)) include:

(a) requisite permission for importing essential machinery and equipment required for the enterprise,

(b) exemption from the payment of customs import duties in respect of plant, machinery, equipment and accessories imported specifically and exclusively to establish the enterprise once approved;

(c) investment allowance of seven and a half per cent;

(d) depreciation or capital allowances of 40 per cent in the year of investment and 20 percent in subsequent years.

In addition, these enterprises which are essentially foreign exchange earning enterprises "may be permitted by the Bank of Ghana to retain in an external account under the supervision of the Bank of Ghana a portion of their foreign exchange earnings for use in acquiring spare parts and other inputs required for the enterprise which would otherwise not be readily available without the use of such earnings" (S.14). Similar provisions were also provided under the preceding Investments Code of 1981. All these appear to be useful measures to encourage Ghanaian licensee firms - which include both indigenous Ghanaian and foreign subsidiary firms - to expand their export activities. However, the continuing inclusion of export prohibitions in technology agreements involving Ghanaian licensees as well as the

continuing absence of any domestic regulation to control such restrictions may stultify these and other measures aimed at improving the export potentials and capabilities of Ghanaian licensee firms.

Other restrictive clauses embodied in technology agreements involving Ghanaian enterprises include excessive controls of licensee's operations. This restriction covers the non-usage by transferees of inputs not approved by the licensors in their manufacturing operations, the non-engagement of the expertise or services of third parties, and the non-manufacture of third parties' products during the term of the agreement.

Tie-in clauses that were encountered featured prominently mainly in agreements relating to the manufacture of consumer goods and durables. In most cases they covered both the raw material input and machinery and equipment. In one of the agreements studied the tie-in clause was so comprehensive that it tied up the Ghanaian company to the foreign licensor for almost every conceivable item the former needed for its operation. Clause 11 of this agreement states:

> The Ghanaian company will buy from or through the English Company:
>
> (a) all materials (except materials produced in Ghana) and/or all finished or partially finished products and goods required by the Ghanaian company for sale within Ghana;
>
> (b) all materials or goods either finished or partially processed required by the Ghanaian company for the production of finished goods or further processing or packing;

(c) all plant and components including plant machinery and equipment required by the Ghanaian company; and

(d) any other thing whatsoever required by the Ghanaian company.

Sub-clause (a) appears to provide an exception and thus gives the Ghanaian company a leeway in respect of certain materials. This exception is unavoidable because the main material contemplated by the sub-clause is cocoa which is the major export crop of Ghana, which until recently was the world's leading producer of this crop. It would, therefore, be absurd to require the Ghanaian company to buy from either another country or the English company which also buys the crop from Ghana. Moreover, it does appear from this agreement and others that even where the licensor is neither the direct producer, or supplier of a particular input it takes upon itself to procure such input for the licensee, thus denying the latter of any partial freedom to look elsewhere for some of its own manufacturing inputs. The only instance where such freedom may be forthcoming is where the licensor or "its nominated agents are unable to supply.... within a reasonable time" such inputs.

Another restrictive covenant the occurence of which, as Table 5:4 illustrates, is minimal is limitation on R & D. As already indicated, this restriction may not have much significant impact, especially where, as it is the case of Ghana, there does not exist the necessary pool of scientific and technical personnel and adequate resources to undertake research on foreign technology with the aim of adapting it to the local environment. In an attempt to increase the

science and technical manpower resources the government is undertaking a programme of expansion of the science and technical institutes in the country. Furthermore, in order to stimulate scientific research in certain industrial sectors all enterprises with priority status which undertake or support a programme of scientific research for the development or advancement of the enterprise shall be entitled to have the capital expenditure in respect of such research fully deductible (S.12(2) of PNDCL 116).

Table 5:5

Restrictive clauses according to type of ownership of the technology-receiving enterprises in Ghana

	Nature of Foreign Participation		
Type of Restriction (1)	**Subsidiary (2)**	**Minority Capital (3)**	**Licence Agreement (4)**
Export	7.69	7.69	84.62
Post Expiration	-	50	50
Excessive Control	-	-	100
Tie-in	14.28	14.28	71.42
Field of use	-	-	100
No-challenge	-	50	50
Grant-back	100	-	-

Source: Based on Analysis of 40 Agreements provided by the Bank of Ghana

The remaining restrictive practices that were encountered in the agreements studied include unduly long duration of agreements which ranged from 10 to 20 years, post expiration restrictions which relate

mainly to the non-disclosure of secrets and confidential information, no-challenge, and grant-back clause all of which apart from the latter were embodied in agreements in which government enterprises or enterprises in which government has proprietary interest are also parties.

A further examination of the occurrence of these clauses indicates, as demonstrated by Table 5:5, that they are most pronounced in agreements with non-affiliate Ghanaian enterprises, that is enterprises which are neither subsidiaries of licensors nor in which they have equity participation. This is followed by cases in which foreign licensors have a minority participation in equity. In this class there is one particular agreement that involving Firestone International and Firestone (Ghana) Limited (now Bonsa Tyre Company Limited) which accounted for most of the restrictive practices. Though the former had 60% shares in the latter (and the Ghana Government 40%) the licensing agreement between them accounts for almost all the restrictive practices under the minority capital category (though in this case the foreign licensor had the majority capital).

In the case of the restrictions under column 2 they are accounted for by the agreement between Cadbury (Ghana) Limited and its parent company. In addition to the export prohibition included in the agreement there is the strange provision that the parent company shall not, without the consent of its Ghanaian subsidiary, engage in the importation into or sale in Ghana of any finished products which the Ghanaian company should be manufacturing or processing except by way of sale or supply to the latter. This provision appears to provide a refined mode for the parent company to partake in the Ghanaian market, thus sharing it with its subsidiary and making up for excessive demand that may occur in the market. The same agreement accounted for the

tie-in and the grant-back under column 2. It is the only agreement in which a grant-back covenant is embodied. This may be due to the reason that licensors do not anticipate Ghanaian licensees making any meaningful improvements or contribution to their technologies. However, this particular agreement covers the food industry, and since the latter does not necessarily involve very sophisticated technology valuable contribution by licensees cannot be ruled out completely. It is, therefore, not surprising that grant-back is included in this particular agreement. The inclusion is also important for the simple reason that any improvement made in Ghana could be useful for the licensor's markets in other parts of Africa and the third world.

Technology Transfer Regulations in Ghana

In view of the fact that restrictive practices still occur in technology transfer transactions involving Ghanaian licensees it may be relevant to ask how effective the measures devised under Act 437 and PNDCL 116 have been in dealing with these practices, and how can they be ameliorated to make them more effective in accomplishing their desired goals. However, since the latter was promulgated only in July 1985 and has not been in existence long enough to merit any meaningful evaluation of its effect we shall examine the effects, if any, of the former.

Act 437 like PNDCL 116 created the GIC (1981-1985) to regulate foreign investments as well as the transfer of technology to the country. The Act made provisions to control technology transfers and called for regulations under its S.41 for that purpose. However, these regulations, between the dates the Act was promulgated and

repealed in 1981 and 1985 respectively, were never made, so that between these periods the GIC did not have the requisite comprehensive and coherent rules to guide it in regulating technology transfer transactions. In addition, the absence of these regulations considerably restricted the GIC's Technology Transfer Department's scope of operation.

Another unfortunate feature that also affected the Centre's function is the presence of the reservations - some genuine but others unfounded - made by some sectors and government officials in relation to the merits of Act 437 itself, and the competence and jurisdiction of the GIC over technology transfer matters affecting both the public and private sectors. It is not surprising, therefore that despite the fact that there existed a technology transfer department within the then GIC, the Ministry of Industry, Science and Technology (MIST) in 1981, the same year Act 437 came into effect, set up the Technology Transfer Centre (T.T.C.) within the outfit of the Council for Scientific and Industrial Research (C.S.I.R.) to advise it on matters relating to technology transfer. The broad functions of the T.T.C. clearly duplicated the former GIC's and still duplicates the present GIC's, and there appeared and still appears to be an ongoing rivalry between them as to which one is more competent to regulate technology transfer transactions. Similarly, other government institutions such as the Public Agreement Board (PAB)[11] and GIHOC which had, before

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11. The PAB was set up by S.42 of PNDCL 42 and replaces the Public Agreement Review Committee whose functions have been taken over by the former. The functions of the PAB include the review of all public agreements and prescription of procedures and criteria for all government agencies or organisations, public corporations and other bodies in relation to the negotiation and conclusion of public agreements covering contracts for goods and services and projects in the mining, industrial, agricultural and commercial sectors.

the enactment of the Act, been carrying on investment promotions and regulations also appeared and are still reluctant to surrender these functions to the GIC which they consider new, and may be, in the case of GIHOC, alien to its operations.

This situation seems to have been exacerbated by the coup d'etat of December 1981. The GIC, as one official put it, was in the process of settling down to its obligations when the coup took place. This, according to the same official, completely unsettled the GIC, and opposing parties to its technology transfer functions used that opportunity to cash in heavily to its detriment by reiterating their reservations regarding the efficacy of the Act and the GIC, and lobbying members of the new government against it.[12]

All this seems to have affected the effectiveness of the 1981 Investments Code (Act 437), as well as the spirit of the Code which was to centralise the investment promotion and regulation functions in one central institution. Consequently, the above mentioned government institutions as well as private enterprises continue, individually, to use their own evolved systems, procedures and practices relating to technology purchases. For example, GIHOC has not only established its own mechanism but has its own qualified personnel for examining, screening and procuring its technological requirements, and in the private sectors individual enterprises have a free hand in the procurement of technology. Government intervention here is only related to the approval of licensors' royalties and fees, normally expressed in foreign currencies, by the Bank of Ghana. The Bank, in the absence of any regulations on this issue, has set up its own ceiling for such payments. The payment of royalties by the Bank is

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12. Interview with a senior official at the GIC, Accra, October, 1984.

calculated on the basis of at most 4 per cent of total turnover.[13] It must be noted that this is only an administrative practice the application of which, as observed by one official, has not always been very uniform.[14]

It is in the context of the above that the promulgation of the new Investments Code, PNDCL 116 becomes relevant. The enactment of this law preceded a process of re-examination of the then existing legal regime as well as other institutional measures relating to technology transfer control, and generally seeks to correct the inadequacies of the preceding enactment. Though PNDCL 116, as already hinted, has some weaknesses (supra) it, nevertheless, appears to be an improvement over the previous code.

It is imperative to point out, however, that irrespective of its quality PNDCL 116 may suffer a similar fate as Act 437, particularly in connection with its control over technology transfers if the regulations called for in S. 30 of the former are not made as early as possible. Without such regulations the GIC may not have any consistent criteria to guide it in either approving or disapproving technology transfer transactions. As already observed, it would have been much preferable, based on the experience of Act 437, to have made the adoption of these regulations by the Board mandatory and also within a specified time period. This would enable the timely adoption of the regulations which would, in turn, eliminate any undue delay by the GIC in the execution of its technology transfer regulatory functions. It is important that the adoption of these regulations should be accompanied by the development of a monitoring system which

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13. Interview with a senior official at the Bank of Ghana, Accra, October, 1984.

14. Same interview.

will ensure their compliance. It may also be added that the question should not only be one of the timely adoption of any regulations as such but the relevance of such regulations to the government's entire technology acquisition and development programme which clearly and necessarily calls for a well articulated technology strategy.

Furthermore, it may also be advisable to avoid the unnecessary duplication of institutions for regulating technology transfer and the ensuing rivalry as is presently the case in Ghana. This does not only lead to the dissipation of human resources but also to increased government expenditure, especially for running such institutions. Accordingly, it may be reasonable to bring together the functions of regulating the transfer of technology and possibly its development within one organisation. This will help to ensure consistency and optimum benefit in technology transfer and development policies and plans. It must be emphasised, however, that the organisation does not need to be a physically centralized facility with all functions centralized under one roof. It may have various units or divisions under different roofs but must have the authority to co-ordinate and supervise the units. So that instead of the PAB, GIHOC, TTC and GIC competing with each other it may be reasonable to bring under the authority of either the GIC as the government is apparently but passively doing or any of the above institutions the functions relating to the transfer into and development of technology in the country.

Having assessed the effects of the individual patent statutes and the technology transfer regime being developed to counteract, inter alia, anticompetitive practices including those discussed above we shall now proceed to evaluate the general impact of the patent system in the transfer of technology to Ghana.

The Ghanaian Patent System and the Transfer of technology

In evaluating the success of the Ghanaian patent system in the transfer of technology to the country the factors that may be taken into consideration will include the efficacy of the system in the disclosure, spread or diffusion of new technical knowledge, its influence on the inflow of patented goods, and its effects on patent licensing, FDIs and joint-ventures.

If the disclosure or spread of new technical information is to be considered as technology transfer, then one can argue that the Ghanaian patent system has not been effective in that regard. Besides the limited usefulness of patent disclosures which can be attributed to the patent system as a whole (supra) the very set up of the Patent Office within the outfit of the RGD has not made the Ghana Patent Office very useful as a data bank for technical information. Since its establishment it has been performing the function of only registering inventions and ignoring the crucial role of serving as a technology data base. It is surprising to note that apart from the registration of inventions the Patent Office in Accra never publishes any inventions. In fact, it has never published a journal or anything that contains the inventions it has been registering since its inception. Similarly, after inventions have been registered by the Office the relevant files are shelved in such a way that they are in some cases never traced again and even if traced it is usually with very great difficulty. For example, besides the experience of the author, a top government pharmacologist at GIHOC Pharmaceuticals complained that his visits to the RGD, Patent Division to acquaint himself with the development of certain drugs led him nowhere because the Office could not trace for him the relevant files. All this has

contributed to the ineffectiveness of the Ghanaian patent system in disseminating technical information.

This state of affairs at the Patent Office is blamed by officials on succeeding governments' neglect of the Office. According to the complaints of these officials the Office lacks money for printing purposes and adequate office space and resources for the effective performance of its functions. It may be mentioned in this respect that in spite of the present government's overt pronouncement of commitment to the development of the country's technological infrastructure the neglect of the Office as well as other institutions connected with technology development still persists. Though this continuing neglect by the present regime may not necessarily be deliberate it is, nevertheless, a reflection of the degree of the government's said commitment or its inability to identify the true national agents for technology development and thus provide adequately for them. It seems to be the case that until the Patent Office receives the necessary resources and attention from the government, and in addition develops and maintains it as a technical information data base, as opposed to a mere registration centre, it will not play any meaningful role in facilitating the transfer and development of technology in the country.

However, if the importation of patented products should be considered as technology transfer, then it could be argued that the Ghanaian patent system has been successful in transferring technology into the country. The greater number of registered patents in the country are "worked" only through the importation into the country of their patented products. This, however, is not considered by a number of LDCs to constitute domestic exploitation. Ghana, like most LDCs, is more interested in the domestic working of inventions for which it

grants monopoly privileges than the importation of patented products or those derived from patented processes. Nevertheless, the majority of Ghanaian registered patents are not locally exploited.

In fact, there is a great number of patents for which annual renewal fees are paid yearly in order to keep them alive (see Table 5:6) but for which no attempts have, since the date of their registration to the present, been made to have them exploited. The truth of the matter is that most patents are not worked in the country and there is neither any urgency nor obligation on patentees to exploit their inventions. The Ghana patent law makes no provision for dealing with abuses of patent rights including non-working. This means that there are no existing provisions under the law to compel local working of registered inventions. Similarly, there are no patent-abuse-checking measures such as compulsory licensing, revocation or forfeiture. Consequently, the conduct of patentees in respect of their Ghanaian patents will invariably be regulated by their business interests and conscience.

Table 5:6

Patents in force on 31st December 1982

Broken Down by Year of Grant

Granted in	1982	16
	1981	19
	1980	17
	1979	37
	1978	39
	1977	75
	1976	45
	1975	52
	1974	50
	1973	48
	1972	61
Before (1962-1971)	1972	461
TOTAL		922

SOURCE: Registrar-General's Department, Accra, Ghana.

In assessing the impact of the Ghanaian patent system on the transfer of technology to the country through the conduits of patent licensing, joint-ventures and FDIs it could generally be said that it has not been very effective. Patent licensing simpliciter as a vehicle for transferring technology to Ghana is very rare. This may be attributable to the lack of competent licensee firms with qualified personnel capable of undertaking autonomous exploitation of licensed inventions, or the difficulty patentees encounter in getting capable licensee enterprises to work their inventions. Consequently, the licensing of patents as well as know-how usually go together as part of an entire investment package.

Similarly, it may not be wrong to assert that patents have not , on their own, been able to prompt joint-ventures and FDIs in the country. As has already been observed, the majority of inventions which are registered in Ghana are not worked by their owners. However, a few of these registered inventions which are known to have been exploited or are being exploited have been done or are being done as part and parcel of entire investment projects and not simply because of the protection offered by the patent system. These include inventions in the tyre industry registered by Firestone, in the intra-venous infusions industry registered by VIFOR S.A. and in the food industry registered by Cadbury and Nestles. Moreover, in the case of these and other inventions which are being exploited through joint-venture arrangements or FDIs there are, in addition to patents, other more compelling considerations such as the domestic market, as demonstrated by the case of the pharmaceutical industry, which induce such workings.

It is appropriate to mention here that while patent protection has not been very effective in transferring technology to Ghana through FDIs and other conduits its withdrawal or cancellation with respect to pharmaceutical products by NRCD 81 has, paradoxically, as already mentioned, led to an increased participation by foreign patentees in the domestic pharmaceutical industry. This participation has been effected essentially through FDIs, licensing and other manufacturing arrangements involving both foreign and indigenous pharmaceutical firms. Available evidence suggests that this participation in the local pharmaceutical industry has been very beneficial to both the indigenous firms and personnel in the industry. The FDIs have enabled the domestic labour force to acquire, in the course of their employment, useful skills in drug production. With respect to patent and know-how licensing and manufacturing arrangements they involve the training of the licensees' personnel by licensors' teams of experts and the use of the licensors' processes in the manufacture of the products covered by the arrangements, and these it must be noted, are important modes of acquiring useful skills.

The usefulness of these modes of technology acquisition is appreciated by one of the indigenous firms involved in these arrangements. The General Manager of GIHOC Pharmaceuticals, in relation to its arrangements with May and Baker, observed that one of the advantages they have gained from that arrangement is the experience they have acquired from May and Baker's team of experts sent to the premises to undertake test runs of the products covered by the arrangement. In addition, the provision of technical assistance by the foreign party to GIHOC Pharmaceuticals has helped to improve the technical skills of its personnel. Finally, GIHOC Pharmaceuticals is able, by virtue of this arrangement, to use May and Baker's tablet

punches for the production of its own products. All this, according to the General Manager, and "our ability to use knowledge and skills acquired to improve upon the manufacture of our own products have enabled us to offer on both the Ghanaian and other West African markets very competitive products".[15] It may be added that the production of drugs by GIHOC Pharmaceuticals under their generic names and the practice of drug prescription in Ghana by their generic and not trade names do also account for the Corporation's competitiveness in the Ghanaian market. On the whole, the NRCD 81's abolition of patent rights for pharmaceuticals can be seen as a significant development in the Ghanaian pharmaceutical industry.

The most significant lessons emanating from the promulgation of NRCD 81 and its effects on the pharmaceutical industry, though the raison d'etre behind its enactment is utterly different, include the fact that countries can, in fact, discriminate between different industrial sectors in their patent policy. By excluding pharmaceutical products from patentability the Ghanaian patent system is discriminating against the pharmaceutical industry.

The other important lesson is that the patent regime can be a useful mechanism for either the promotion or discouragement of the inflow of foreign technology, and can, thus, be utilized in furtherance of government technological policies such as the development of indigenous technological capabilities in certain technological fields.

Though limited in scope NRCD 81 has had a significant impact on patenting activity in Ghana and the transfer of technology to that country. Nevertheless, the Decree, as the former Chief Justice of Ghana, Mr. Justice F.K. Apaloo rightly observed "is no substitute for

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15. Interview with the General Manager of GIHOC Pharmaceuticals,

comprehensive indigenous legislation" (quoted in "West Africa", 8 April 1985, p692).

The Search for an Indigenous Ghanaian Patent Law

The need for a new patent law for the country is increasingly growing and series of attempts are currently being made in that direction. However, efforts so far made have not yielded any fruit. The most recent and concrete endeavour in this respect is that made by a renowned retire Ghanaian Appeal Court Judge, Mr. Justice Amissah. He was commissioned by the U.S. AID to study the prospects of promulgating a new patent law for the country. This assignment took him to Brazil, India, USA, Israel, Kenya and the WIPO. He eventually came out with a draft proposal for the possible enactment of patent legislation which did not apparently seem to reflect much of the provisions of the laws of the countries he visited. The proposals were, in essence, a replica of the ESARIPO[16] Model Law on inventions for English-Speaking African countries, the provisions of which are merely guidelines. These draft proposals were eventually rejected by a committee set up to study them on the grounds that they did not reflect the needs of the country.

After the rejection of these proposals another committee has been set up to study the issue of a new patent law. In spite of the fact that the Amissah proposals were rejected because they were essentially based on the ESARIPO Model Law and did not relate to the

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16. ESARIPO, as already noted, stands for Industrial Property Organisation for English-Speaking Africa.

needs and level of economic and industrialisation development of the country, the new committee seems to be falling into the same trap. The committee is currently using the ESARIPO Model Law as the main basis of its work, and some committee members have expressed great concern about the extent to which other members are prepared to go in adopting the Model Law. The discontent of the former has made impossible regular committee meetings the absence of which is seriously affecting its work and is likely to delay the emergence of a new patent law for some time to come.

Though a number of the provisions of the ESARIPO Model Law[17] may not necessarily be very useful to the country, there are some including that relating to importation (S.35(3)), which deserve very close attention in view of the LDCs' position on importation of patented products as working and other aspects of the patent system. Consequently, while the use of the ESARIPO Model Law as a basis for the Committee's work may be an appropriate issue for consideration, it may appear to me, however, that the crucial issue the committee should address itself to is whether a new patent law that they may come up with will be relevant to the country's level of industrialisation and economic development, and, in addition, whether it could, among others, be effectively used as an economic instrument for national development.

Accordingly, the provisions of the patent legal regime to be devised, particularly those relating to patentability, duration, measures against abuses of patent monopoly and utilization of patent fees as a flexible instrument of patent policy must be directed towards that goal.

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17. See Chapter 6 for a discussion of some of these.

Patentability

NRCD 81's exclusion of pharmaceutical products from patentability demonstrates quite clearly that the patent law of Ghana, like many other countries, discriminates between different industrial sectors. In view of the impact of this discriminatory policy on the local pharmaceutical industry it may be appropriate for the Committee to pursue this a little further and examine more carefully how it could use this discriminatory element of the country's patent system in relation to the country's technological, economic and developmental needs. In this respect, the patent system could be used to sieve out or block the inflow of any foreign technology, such as the plastic cigarette container registered by Philips Inc. USA (supra), which may either have very little economic value and, therefore, not contribute much to the developmental process, or may have the potential of frustrating such process. Accordingly, policies on patentability may need to be designed in terms of the country's economic development goals.

Similarly, provisions on patentability may be evolved in relation to the development of I.T.C. so that the country can employ its patent system as part and parcel of its overall I.T.C. development by discriminating between not only industrial but technological fields. This will, therefore, require a more selective approach on the subject of patentability, and, thus, go beyond discrimination between sectors to discrimination within sectors. With this approach it will be possible to exclude from patentability certain technological fields considered to be strategic or of public interest, and still be able to reserve them for indigenous development.

It is important to note, however, that because of the principle of national treatment enshrined in the Paris Convention Ghana, which is a member of the Convention, cannot discriminate between its nationals and foreigners. It cannot, therefore, grant patents to its nationals in areas excluded from patentability and at the same time refuse foreign inventors the same privilege. However, the effect of this approach will be to prevent the inflow of a given foreign technology while, simultaneously, encouraging the local development of that relevant technology without any impending outside threat.

The use of the patent system in this way may, to a considerable extent, provide an effective protection for I.T.C. The combination of this use with others such as licensing requirement may not only make possible the ingress of the very relevant and complementary foreign technology but also the efficacious furnishing of the desired protection for I.T.C. since the non-grant of both patent and license seals off almost all avenues for the influx of undesirable technology. The discriminatory use of the patent system may, therefore, contribute immensely to the development of I.T.C. and contribute harmoniously to the entire national technological and economic development.

This discriminatory use of the patent system is possible without infringing the Paris Convention. In fact, G.H.C. Bohenhansen, Director-General of BIRPI (now WIPO) from 1963-1973 emphasized that, "In the field of patents... the Convention leaves the member states entirely free to establish the criteria of patentability, to decide... whether patents should be granted for products only, for processes only or for both and in which fields of industry and for what term", (cited in UN, 1975, 44). It is worth mentioning that such a discriminatory approach has already been adopted by the Andean Pact

(See Article 26 of Decision 24) which makes its policy on patentability easier to use to discriminate against technologies the indigenous development of which may require protection. Ghana may need to consider the usefulness of such an approach.

Duration of Patents

Another area where it may be necessary for Ghana to consider carefully in adopting its own patent law is the duration of patent. Instead of adopting the comparatively more reasonable ESARIPO recommended uniform duration of initial 10 years and a subsequent possible additional 5 years[18] (S.35 (1) & (2)) it may be useful to consider the adoption of a more flexible duration period which should relate to either the merits of the inventions, the sector to which the invention relates or the actual exploitation of the patent. The adoption of such a flexible approach need not erode the notion of a "fair return" (UN, 1975). That is, it should guarantee the patentee a fair return on his inventive efforts while at the same time it should not sacrifice the public interest.

It may be argued that the fact that Ghana finds it necessary to exclude the pharmaceutical sector, in some countries more than one sector, from patentability suggests that from its point of view the optimum term of patents in the excluded sector is deemed to be zero. It may, therefore, be inferred that from the standpoint of the public interest, the optimum term of patents cannot be regarded as being

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18. Compare this with the BIRPI recommended period of 20 years and WIPO's of first 15 years and subsequent 5 years.

the same for all sectors and all patents within sectors. It may, therefore, be appropriate for the country to endeavour to follow a rational policy of granting a flexible and selective duration for patents on the criteria of under which sectors they fall, their merits, their contribution or impediment to the effective implementation of national technology policy, or their exploitation.

Such an approach has been adopted in some LDCs. For example, in India the duration of a patent is, in general, 14 years from the date of the complete specification. However, the duration for food and drug patents is either seven years from the date of the filing or five years from the date of sealing, which ever period is shorter (UN, 1975). Similarly, in Argentina patents are granted for 5, 10 or 15 years taking into account, inter alia, the merits of the invention (Ibid). Ghana can follow the example of these countries in using patent as a tool for its technological and economic development.

Patent Fees

Patent fees could also be a flexible instrument of patent policy. Any provisions in a new patent law must be realistic. It will be recalled that the patent fee prescribed by NRCD 81 is not only inadequate to contribute to meeting operational expenditure but it is also uniform irrespective of the varying economic significance of inventions requiring protection. It may be necessary to introduce reasonable criteria in levying patent fees which will need to reflect the value and economic significance of the various patents. This will permit the utilization of patent policies, like tariffs, towards end-specific goals. The introduction of any criteria in levying patent fees must also take into account the possibility of making such

fees either meet or contribute to the cost of running the national patent office so that government subventions allocated for this purpose could be employed for other purposes such as increased resources for domestic R & D. Finally, any national criteria for levying patent fees must make it possible for the annual renewal fees to weed out patents of less economic significance to both the country and the patentee.

Other Measures

Finally, it may, in addition, be necessary to consider the inclusion in a new patent law for Ghana measures such as revocation and forfeiture to deal with patent abuses, and compulsory licence to ensure the domestic working of registered patents. This will definitely rectify the present state of the law where no measures exist to combat non-working and other abuses of patents. The efficacy of these measures, particularly compulsory licence, have been found to be questionable (supra) and it is the responsibility of the committee to devise ways and means to ensure their effectiveness.

Conclusion

It does appear, especially from the discussion on the effects of Cap. 179, that the time has come for Ghana to abrogate the existing patent law and in its place adopt its own independent and authentic legislation which will reflect its peculiar level of technological and economic development. This will not only make it more relevant to the country's needs but it will also avoid the unnecessary tedious

procedure and cost associated with the present patent regime. In addition, this could, in turn, increase indigenous R & D, furnish inventors with the required legal protection, and make possible the effective transfer of technology to the country.

In evolving its own patent law the country may need to learn from the significant effects of the promulgation of NRCD 81, particularly regarding the pharmaceutical industry as well the patent regimes of other LDCs, and, thus, endeavour to utilize patents as a tool for economic development. In this respect serious consideration will have to be given to issues such as patentability which should be used harmoniously with government technology strategy either to encourage the inflow of technologies needed to contribute to I.T.C., or to discourage the inflow of those which may endanger its development. Similarly, issues such as patent duration, fees, and others must be used as economic measures for end-specific goals. It may also be added that the patent office to be established by a new patent enactment must not only seek to give effect to such enactment, but must, in addition, serve as an effective agent for the dissemination of new technical knowledge.

For the patent system to be successful as an economic policy measure and in transferring relevant technologies to the country it will need to be backed up by other related regimes and institutional measures. Consequently, the Investment Code, 1985, the regulations to be adopted to control technology transfer transactions and the GIC all have a contribution to make in this respect. As discerned from the above, restrictive practices in patent licensing and other technology transfer transactions still occur in Ghana, and the enactment of the previous and present Investments Codes (Act 437 and PNDCL 116 respectively) could be seen as an attempt to combat such practices.

The failure of Act 437 to expunge these practices during the period of its operation ordains the early adoption of the necessary regulations called for by S.30 of PNDCL 116 if the latter is to accomplish its goals. These regulations must necessarily fit into government technology plans and policies in order to ensure their continuous execution. Finally the regulations will need to be supported by a well developed monitoring scheme which will ensure their compliance. In this way, the above measures could contribute to the effective transfer of technology to Ghana and its subsequent indigenous development to satisfy the needs of its people.

CHAPTER 6

THE NIGERIAN PATENT SYSTEM AND THE TRANSFER OF TECHNOLOGY: LAW

Introduction

It will be recalled that the main patent legislation which governed the administration of patents in Nigeria before 1970 was the Registration of U.K. Patents Ordinance of 1925 as amended by the Patent Rights (Limitation) Decree, 1968. The 1925 Ordinance, as already indicated, incorporated the then Nigerian patent system into the U.K.'s and made the procurement of patents in Nigeria dependent on prior U.K. grants.

There was, however, in 1970 a major departure in the patent law and system of Nigeria which was brought about by the promulgation of the Patents and Designs Decree, 1970 (Decree No. 60). The Decree came into force on 1 December 1971 and repealed the Registration of U.K. Patents Ordinance 1925, the Patent Rights (Limitation) Decree, 1968, and (in so far as they were in force in Nigeria) the U.K. Patents Act, 1949 and amendments thereof. Decree No. 60 of 1970 set up an independent patent system for Nigeria and sought to disentangle it from the colonial arrangement that preceded it. The Decree, unlike the preceding Ordinance, made possible the direct procurement of patents in Nigeria without any prior recourse to the U.K. Patent Office.

The Decree is modelled on the BIRPI[1] Model Law for Developing

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1. BIRPI stands for the International Bureau for the Protection of Intellectual Property and was the predecessor of the World Intellectual Property Organisation (WIPO).

Countries on Inventions published in May 1965 (hereinafter referred to as the BIRPI Model Law). The modelling of the Decree on the BIRPI Model Law, it may be noted was not founded on any national planning policy consideration, in particular any coherent and comprehensive national technology plan because none existed at that time. It is only recently that a committee has started working on a comprehensive technology policy for the country. It may, however, be pointed out that the structuring of the Decree on the Model Law is by no means a matter of accident. The adoption of the latter by Nigeria, it does appear, must have been influenced by the active participation of that country's then Acting Registrar of Patents in the various proceedings that eventually resulted in the birth of the BIRPI Model Law. A reading of the provisions of both the Decree and the Model Law reveals striking similarities between them.

Provisions of Decree No. 60 of 1970

Decree No. 60 of 1970 makes comprehensive provisions concerning the grant and administration of patents. These provisions cover issues such as patentability of inventions, applications for and grant of patents and patent licenses.

Patentable Inventions

According to S.1(1) of the Decree an invention is patentable if:

(a) it is new, results from inventive activity and is capable of industrial application, or

(b) if it constitutes an improvement upon a patented invention and also is new, results from

inventive activity and is capable of industrial application.

S.1(2) goes further to explain the concepts of novelty (which is world-wide), inventive activity and industrial application all of which seem to have been copied from Sections 2, 3 and 4 respectively of the BIRPI Model Law. The definitions given to these concepts by the Decree do not generally seem to differ from those of other convention countries.

The significance of the definition of patentable inventions as offered by S.1(1) of the Decree which is based on S.1 of the BIRPI Model Law is the inclusion of improvements on a patented invention. This may be especially beneficial to Nigeria and other LDCs because it could stimulate indigenous inventive skills to either improve upon or adapt foreign inventions to the local environment and conditions or otherwise render them readily usable in their own country. It must, however, be borne in mind that the procurement of patents for such improvements must, according to S.1(1)(b), satisfy the requirements of novelty, inventive activity and industrial applicability. This requirement copied by the Decree from the BIRPI Model Law (see S.1(2)) represents the Model Law committee's position on the issue as well as its rejection of the suggestion that because of the possible advantage for LDCs they should be allowed to grant patents of improvements for relative simple modifications of inventions or techniques even when "inventive activity" was lacking (BIRPI, 1965, 19).

The provisions of S.1(1)(b) of the Decree as well as the Model Law Committee's stand on the issue do appear to be in complete conformity to the definition and logic of patentability. It may be

suggested for Nigeria and other LDCs that they could, in the case of simple but useful improvements which may not be able to satisfy the requirement of patentability, make provisions under their patent laws for the grant of rights such as "utility model" or "petty patent" for which only a lower novelty requirement is needed and which offers protection at a much lower financial and administrative cost in return for a shorter duration of protection.

It is important to note that despite their possible usefulness, particularly with respect to the adaptation of foreign technologies to the peculiar environments of LDCs which could involve a high degree of novelty, improvements on patented inventions are not included in the definition of patentable inventions as contained in the ESARIPO Model Law for English-speaking African countries on patents (hereinafter referred to as ESARIPO Model Law). It may also be noted that the revised version of the BIRPI Model Law as contained in the WIPO Model Law for developing countries on inventions published in 1979 does not similarly include improvements in the definition of patentability.

Non-Patentable Inventions

Under the Decree, a patent cannot be obtained for plant or animal varieties, or essentially biological processes for the production of plants or animals except for microbiological processes

and their products (S.1(4)(a)). In addition, a patent will be refused for any invention whose publication or exploitation would be contrary to public order or morality (S.1(4)(b)). These exclusions are based on those of S.5(a) and (b) of the BIRPI Model Law respectively. Finally, principles and discoveries of scientific nature are also excluded from patentability by the Decree (S.1(5)). The significance of these exclusions is that the Nigerian law, like the Ghanaian, by virtue of its provisions on patentability and non-patentability does in fact discriminate between the various types of inventions which can qualify or not for Nigerian patents. It may be added, however, that the discrimination here is not one of economic policy. This is not surprising since the Decree, as already observed, was not promulgated within the context of any technology policy.

Application for and Right to Patent

Any person whether the true inventor of an invention or not can apply for a Nigerian patent, and the right to the latter is vested in the statutory inventor.[2] S.2(1) of Decree No. 60 defines the latter as "... the person who whether or not he is the true inventor, is the first to file, or validly to claim a foreign priority for, a patent application in respect of the invention". Clearly, S.2(1) following S.8(3) of the BIRPI Model Law establishes an "irrebutable presumption of inventorship", and enables the person who first files a patent application or validly claims the earliest priority for an application relating to the same invention to be considered to be the inventor.

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2. See the introduction to Chapter 2 (Right to Grant of a Patent) of the BIRPI Model Law.

Two merits seem to be associated with this provision. First, it may help to encourage the earliest possible disclosure of the invention to the public by rewarding the person who first publishes it through his application for a grant. It must, however, be pointed out here that the presumption of inventorship may not necessarily be in favour of the first applicant for an invention in Nigeria who may be a Nigerian because if there is another applicant whose claim of priority and the date thereof precedes that of the filing of the first Nigerian application he will obviously have the right to the patent. The second merit as indicated by the commentary on the corresponding BIRPI Model Law provision is that the presumption makes it possible to avoid litigation on the "frequently very controversial question of who is the true owner" (BIRPI, 1965, 27).

Nevertheless, S.2(1) of the Decree is liable to abuse. For example, a person who happens to learn of another's invention can, if he is the first to apply for a grant relating to the same invention in Nigeria, obtain a monopoly right for it unless and until his claim to the invention is challenged or contested. Similarly, the first and true inventor of an invention already filed in a convention country can have his patent monopoly right eroded by a person who first applies for a patent protection in Nigeria for the same invention if the former does not also take the necessary steps to protect his rights in that country.

To safeguard the possible abuse of the provisions of S.2(1), S.2(2) provides, however, that the true inventor or owner of the invention is entitled to be named in the patent whether he is the statutory owner or not. This entitlement, according to the Decree, cannot be modified by contract. Moreover, S.2(3) adds that where a person, without the consent of the inventor or his successor in title,

applies for and obtains a patent for the invention then all the rights emanating from the application and the patent grant shall be deemed to be transferred to the inventor or his said successor.

In spite of these safeguards it is doubtful whether S.2(1) can be free from abuse. For instance, it may still be difficult to discover the true owner of an invention, especially if he does not find a Nigerian patent attractive, and thus, does not apply for one. It may not be unreasonable to suggest that the provision could breed patent piracy. It is, therefore, not surprising, that the provision of S.2(1) of the Decree derived from the BIRPI Model Law has been rejected by the WIPO Model Law[3] which is a revised version of the former, and also has, to a greater extent, not been adopted by the ESARIPO Model Law.[4]

The latter two model laws like the BIRPI Model Law adopt the first-to-file rule which is simple to apply as it is not always easy to prove the date on which an invention was developed. The difference between them and the BIRPI Model Law, however, is that their first-to-file rule, unlike the latter's, relates to only the true inventors where they are two or more, and have made the same invention independently. In such a case the first true inventor to apply, contrary to the BIRPI Model Law where the first applicant may or may not be the true inventor, is entitled to a right to a patent. This is made very clear by both S.10(3) of the ESARIPO Model Law and the commentary thereon (See WIPO, 1978, 32), and in the case of the WIPO Model Law by the commentary on S.119 (WIPO, 1979, 64).

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3. See S.119 of the WIPO Model Law.

4. See S.10(3) of the ESARIPO Model Law.

Though the then Registrar of Patents, Trademarks and Designs of Nigeria was among the eminent experts who advised and assisted the WIPO on the preparation of the ESARIPO Model Law, the Nigerian law on the issue has not been altered to reflect the former and still continues its adoption of the BIRPI Model Law provision, which as we noted earlier on could encourage patent piracy. However, this could be minimised if the examination of patent applications covered both form and substance whereby it might be possible to reveal the true owners of inventions as well as inventions already published. This, unfortunately, is not the case under the examination system adopted by Decree No. 60.

Examination of Patent Applications

The 1970 Patent Decree confines the examination of patent applications to the form only and does not cover substance. Consequently, in the process of examination the Registrar only ensures that an application satisfies the statutory requirements prescribed by S.3. These are the inclusion in every patent application of the applicant's full name and address, and if that address is outside Nigeria, an address for service in that country, a description of the relevant invention with plans and drawings where necessary and a claim or claims. In addition, the application must be accompanied by a prescribed fee. It is instructive to note that the patent fees prescribed under Nigerian law, like the Ghanaian, are uniform (see Patent Rules 1971, L.N. 96 of 1971, Schedule 1) and do not relate in any way to the varying economic importance of the invention covered by the patent, the value to the patentee of the national market or the

related industrial field of the inventions. Clearly, as we found out in the case of Ghana, the utilization of patent fees as an instrument of economic policy is yet to be adopted in Nigeria. Moreover, a patent application, where appropriate, must include a declaration signed by the true inventor requesting that he be mentioned as such in the patent and giving his name and address, and a signed power of attorney if the application is made by an agent. All these are covered by S.3(1). Another requirement provided by S.3(3) is that every application must relate to only one invention.

There is, however, a further formal requirement which an inventor has to satisfy, but which the Registrar, as we shall see shortly, is relieved from examining. This requirement is provided by S.3(2). According to its provisions the description of an invention:

> ..... shall disclose the relevant invention in a manner sufficiently clear and complete for the invention to be put into effect by a person skilled in the art or field of knowledge to which the invention relates, and the claim or claims.... shall define the protection sought and shall not go beyond the limits of the said description.

This provision, particularly the aspect relating to full disclosure, is very important where there is provided a system of compulsory licensing as is the case under Nigerian law. In such a situation full disclosure of an invention is relevant in order to enable an applicant for a compulsory licence to work a compulsorily licensed invention, especially where the necessary co-operation of the patentee may not be forthcoming. In addition to the system of compulsory licensing adequate disclosure is also relevant to ordinary patent licensing transactions if licensees are to be able to exploit efficiently and

independently licensed patents. Moreover, it is important for the general use of inventions after they have entered the public domain. Finally, complete and adequate disclosure of inventions is necessary if patents are to serve as useful sources of new technical information. However, since under the Decree, patent applications are not substantively examined to assess the adequacy and completeness of the description of inventions the impact of the above provision may not be substantial.

In respect of an application based on foreign priority the statutory requirement is that the applicant must append to his application a written declaration indicating the date and number of the earlier application, the country in which it was first made and the name of the person who made it (S.3(4)(a)). Furthermore, the applicant must provide the Registrar, within three months of the lodging of the application, with a copy of the earlier application certified correct by the relevant office (S.3(4)(b)). Any such application must be lodged with the Registrar before the expiration of 12 months from the date of the prior application (S.27(2)(a)). This, clearly,, is in conformity with article 4(A)(1) of the Paris Convention.

In conducting the examination of patent applications these are the things the Registrar concerns himself with. Depending on which statutory requirements have been satisfied and which have not, the Registrar may grant the patent, reject the application (S.4(1)(a)), request amendment (S.4(1)(b)) which if not complied with will result in the rejection of the application. In the case of an application based on foreign priority the non-compliance with the statutory requirements entitles the Registrar to disregard any claim for priority (S.4(1)(c)).

The most significant provision in respect of the examination system adopted by Nigeria, it will seem, is that of S.4(2). It provides that:

> Where the examination mentioned in Subsection (1) above shows that a patent application satisfies the requirements of Section 3(1) and (3), the patent shall be granted as applied for without further examination, and in particular, without examination of the questions:-
>
> (a) whether the subject of the application is patentable under Section 1,
>
> (b) whether the description and claims satisfy the requirements of Section 3(2), and
>
> (c) whether a prior application, or an application benefiting from a foreign priority, has been made in Nigeria in respect of the same invention, and whether a patent has been granted as a result of such an application.

S.4(2) obviously reiterates the registration system adopted by Nigeria. It is based on S.18 of the BIRPI Model Law, and the Decree thus adopts "Alternative A" of the BIRPI forms of examination which relates to the grant of a patent without examination as to the substance of the application.[5] The underpinning rationale for this type of examination is that the Patent Office is not equipped to examine, and will, therefore, not evaluate issues such as the

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5. The other alternatives put forward by the BIRPI Model Law are the grant of patent after preliminary examination of the substance of the application, and the grant of patent subject to deferred examination of the substance of the application.

patentability of an invention, whether the description of the invention is adequate and complete, whether the claims define the protection sought and do not exceed the contents of the description, whether the same invention has already been the subject of an earlier application or has been patented in the country, and when a priority is claimed, whether this claim is justified because it is founded on a prior application for the same invention. The adoption by Nigeria of a system of registration may obviously be explained by the paucity of technical personnel and other resources required to undertake effectively the examination of the above issues.

Though S.4(2) and the adopted examination system excludes from the Registrar's consideration the above fundamental issues they do appear to have some merits for Nigeria and other LDCs which adopt the registration system. First, it is less time-consuming, inexpensive and makes it easier for both domestic and foreign inventors to register their inventions. In addition, because the system of examination as to form does not put every patent application under close scrutiny it relieves patent offices of the expense and burden of having to engage and maintain persons with high technical qualifications and experience who are not available in reasonable numbers. Finally, it also relieves the patent office from examining patent applications which in any event may, because of the less commercial potentials or prospects, eventually be abandoned. This certainly saves the office some valuable time and resources which would otherwise have been committed to the examination of such applications.

Nevertheless, the registration system may have some demerits which could affect the patent system of countries, including Nigeria,

which adopt it. In the first place, it does not in any way guarantee that patents are granted solely for deserving inventions, that is, those which meet the requirements of patentability as provided by the law. Moreover, it does not, unlike the preliminary examination system, make any contribution to the training of the engineering and scientific staff of a country which adopts it since they do not examine and thus learn from new inventions filed at the Patent Office. Furthermore, because inventions, under the registration system, are not substantively examined in order to ascertain their industrial applicability inventors may not be adequately apprised of the actual value of their inventions before they embark on their exploitation. Similarly, examination as to form does not, unlike substantive examination, provide adequate certainty for other inventors or researchers about which areas or field of knowledge patents have already been granted in, so that they can proceed with research in other unexplored areas. This demerit could also result in their inventive activities rendering them liable to infringement suits.

In respect of the specific issues raised by S.4(2) it could be argued that the non-examination of an invention to determine its patentability may result in the grant of patents for dubious and doubtful inventions whose novelty, inventiveness and industrial applicability may forever remain unprobed. It is very doubtful whether indigenous Nigerian inventions such as the "Nairawise trimming-set", which is a combination of razor and comb, and others for which Nigerian patents have been granted would have passed the test of patentability if they had been subjected to a substantive examination. It is equally doubtful whether such inventions are of any industrial significance to that country.

In addition, the non-examination of the description or disclosure of the invention (S.4(2)(b)) to ensure that it is sufficiently clear and complete to enable the invention to be worked by a person skilled in the art to which the invention relates may encourage the practice of excluding, from patent specifications, essential and concise details as well as the accompanying know-how relevant to the exploitation of the invention in Nigeria. It is instructive to note that even in cases where adequate description of inventions is legally ordained and enforced, it is possible for inventors either to omit essential details, or to blur or cloud the description with unnecessary and excessive details (Supra). Consequently, it will not be wrong to infer that S.4(2)(b) may result in the filing of either inadequate or blurred patent specifications which may make it difficult for indigenous Nigerian technical personnel to learn from and be able to work registered inventions. This obviously defeats some of the essential functions of the patent system, that is, the disclosure and spread of technical knowledge, and the transfer of technology. In the case of foreign registered inventions, particularly those based on foreign priority, it could be argued that the foreign applicants are likely to register patents on which they have priority from an earlier registration and which therefore might have had a full examination.

It may be pointed out, however, that inventors who do not disclose their inventions adequately and completely may stand the risk of falling victims to patent piracy or the practice of "patenting around patents". This practice can provide third parties with the opportunity to study such incomplete disclosed or confused inventions and thus clarify them and make the necessary addition or omission and

then file subsequent applications. Consequently, prior inobscurely described inventions may cease to have effective legal protection. This fear of losing protection over such inventions may, despite the provisions of S.4(2)(b), urge inventors to file complete and adequate specifications. The registration system, it may, therefore, be surmised, relies on the goodwill and the self-interest of the inventor to make a full disclosure of his invention for the risk of losing his protection.

Finally, the non-examination of the claims to ensure that they give a precise definition of the monopoly right sought and to limit this right to the invention as described may encourage wild claims for undeserved monopoly right and eventually result in the proliferation of patent litigation.[6]

While all these may easily be associated with the registration system, it may, however, be noted that the preliminary examination system may not totally be devoid of some of the above defects such as the granting of patents for inventions which do not satisfy the requirements of patentability. It is the case that even in countries including the U.K. where patent applications are examined as to substance patents for certain inventions have at one time or another been revoked because they were not patentable.[7] The difference

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6. See the British Patent System: report of the Committee to examine the patent system and patent law, Chairman MAL Banks, Cmnd, 4407, July 1970.

7. For example see the case of Horville Engineering Co. Ltd. v Clares (Engineering) Ltd [1976] RPC 411 C.A. where the plaintiffs' patent for a load-carrying device consisting of a mobile pallet was revoked on the grounds of obviousness. See also Polaroid Corporation (Land's) Patent [1981] RPC 111 C.A.

between such countries and Nigeria, however, is that while the former examine the substance of patent applications and thus endeavour to prevent or minimise the occurrence of the above situation the latter does not. It may, therefore, not be surprising that the patent grant of preliminary examination countries may be of much "higher presumptive validity" than those issued under the registration system as operated by Nigeria.[8] Decree No. 60, however, endeavours to rectify some of the above defects associated with the Nigerian system of examination by its provision for nullity of patent.

Nullity of Patent

S.9(1) of the Decree following S.47(1) of the BIRPI Model Law attempts to nullify patents granted for inventions which are either not patentable or suffer from defects associated with the registration system. S.9(1) provides that:

> Subject to this section, on the application of any person (including a public officer acting in the exercise of his functions) the court shall declare a patent null and void -
>
> (a) if the subject of the patent is not patentable under Section 1, or
>
> (b) if the description of the invention or the claim does not conform with Section 3(2), or
>
> (c) if for the same invention a patent has been granted in Nigeria as the result of a prior application or an application benefiting from an earlier foreign priority.

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8. The British Patent System, op. cit. p.2

Though it is inescapable or absolutely necessary to provide in any patent law that patents which do not meet the requirements of patentability or the provisions of the relevant law shall, on request, be invalidated or declared null and void, S.9(1) is, however, of particular significance to Nigeria which operates a registration system. Under this system, as the commentary on the BIRPI Model Law rightly put it, "the risk that patents will be granted which do not satisfy the requirements of the law is much greater than in a system with examination as to the substance of the applications". (BIRPI, 1965, 68-69). S.9(1), therefore, becomes necessary to invalidate patents which do not meet the requirements of Decree No. 60. This invalidation, as contemplated by the section, is to be undertaken by the courts.

This exercise by the court is expected to be initiated by the general public and by government officials. While this may be significant since it is in the public interest that patents are granted for only deserving inventions, it is doubtful if the provision as a whole will be able to accomplish the desired goals for a number of reasons.

First, it must be noted that while public officials, such as public prosecutors singled out in the commentary on S.47 of the BIRPI Model Law, with the support of the State and with adequate resources may be in a position to engage in patent litigation they hardly ever litigate over patent rights. The rare occasion on which public officials get involved in patent proceedings are when the government or a government department is sued by a patentee for having allegedly infringed his patent monopoly right.

On the contrary, members of the general public may not have the necessary resources to sustain a prolonged and expensive patent

litigation. In addition, their participation in ensuring the validity of patent is also limited since the Decree confines persons taking a nullity action only to those who have material interest in making the application.[9]

In addition, S.23(3)(b) accomplishes a further reduction of this public participation by the possible prohibition of patent licensees from contesting the validity of patents. While S.23(3) renders any clause in a licence agreement null and void if it imposes any restrictions not derivable from the patent (infra), S.23(3)(b) excludes from such restrictions "obligations imposed on the licensee to abstain from all acts capable of prejudicing the validity of the patent". Certainly, such acts may encompass legal contesting of patent validity. Consequently, by virtue of S.23(3)(b) licensees, who, besides patentees, have considerable material interest in the relevant patents, could possibly be prohibited from challenging the validity of their licensed patents, and thus excluded from the general public in the initiation of an action to invalidate unmeritorious patents. This exclusion, as already observed in Chapter 1, seems to be in accord with the common law doctrine of estoppel whereby a party to a contract, particularly in respect of patents is estopped from challenging the validity of the agreement which he freely enters into while at the same time he enjoys the benefits derived thereunder. However, as we explained in the same chapter, this no-challenge provision is anti-competitive and enables patentees to enjoy

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9. S.9(5)(c) provides that the court "shall dismiss an application under subsection (1) above if the applicant (not being a public officer) fails to satisfy the court that he has a material interest in making the application".

privileges that extend beyond those provided by the patent monopoly grant. Clearly, the provision is most unfortunate, especially in terms of the nullity provision under the Decree, because as the U..S. Supreme Court rightly reasoned:

> Licensees may often be the only individuals with enough economic incentive to challenge the patentability of an inventor's discovery. If they are muzzled, the public may continually be required to pay tribute to would-be monopolists without need or justification. We think it plain that the technical requirements of contract doctrine must give way before the demands of the public interest in the typical situation involving the negotiation of a licence after a patent has issued.[10]

All this may render the shift to the public of the obligation to ensure that patents are granted for only deserving inventions not very effective, and S.9(1) may therefore not be able to rectify sufficiently the defects already discussed above. It may be inferred that most Nigerian grants, apart from those which may be invalidated through legal actions of other patentees, are likely to continue in force throughout their entire life span.

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10. Lear v Adkins, 395 US 653, 23 L. Ed. 610 at 623. See also the E.E.C. Commissions decision on the subject in the cases of AOIP v Beyrard [1976] CMLR D14, Re Agreements of the Davidson Rubber co. [1972] CMLR D52 and Raymond v Nagoya Rubber Co. [1972], CMLR D45.

Grant and Duration

On the satisfaction of the statutory requirements, the Registrar grants a patent to the applicant by the issue of a document containing the number of the patent in the order of the grant, the name and address of the patentee and, if that address is outside Nigeria, an address for service in Nigeria, the date of the patent application and the grant, the description of the invention and the claims, and where appropriate, the name and address of the true inventor (S.5(1)). In cases where foreign priority is claimed the document must, in addition, contain an indication of that fact, as well as the number and date of the application on which the claim is based and the name of the country where it was made (ibid.).

The duration of Nigerian patents is uniform and does not discriminate between the varying types of inventions registered in the country. The life span of all Nigerian patents is twenty years from the date of the filing of the relevant invention (S.7(1)). Nevertheless, it shall lapse before the twentieth year if fees and any surcharges are not paid within the prescribed period. In the case of grants based on foreign priority the twenty year period is reckoned from the date of the prior application. For all this period while the grant is in force the patentee enjoys all the monopoly rights emanating from the grant.

Rights Conferred by Patent

A Nigerian patent confers on the patentee a monopoly right restricting others from exploiting the invention except of course licensees who are duly permitted by the patentee to do so. This is provided by S.6(1) which specifically states:

> A patent confers on the patentee the right to preclude any other person from doing any of the following acts -
>
> (a) where the patent has been granted in respect of a product, the act of making, importing, selling or using the product, or stocking it for the purpose of sale or use, and
>
> (b) where the patent has been granted in respect of a process, the act of applying the process or doing, in respect of a product obtained directly by means of the process, any of the acts mentioned in paragraph (a) above.

The above provision is derived from S.21 of the BIRPI Model Law which is adopted by S.32 of the ESARIPO Model Law and continued by S.135 of the WIPO Model Law. It is interesting to note that the ESARIPO commentary on this provision which is very close to the WIPO commentary makes specific reference to the similarity between S.32 of the ESARIPO Model Law and the above Nigerian provision (WIPO, 1978, 84).

The provisions of S.6(1)(a) and (b) of the Decree are in complete conformity with articles 5(A)(1) of the Paris Convention, which makes importation of patented products not liable to forfeiture (supra), and 5 quater of the same convention, which extends patent monopoly rights to the process of manufacture and the products therefrom, respectively. By virtue of S.6(1)(b) the Decree also extends monopoly rights to processes and products derivable therefrom. The latter, as was explained in Chapters One and Two, has the effect of extending the import monopoly of patentees. To prevent this extension of the import monpoly some LDCs including Brazil have excluded processes for the manufacture of some products from patentability.

Limitation of Rights

Three kinds of limitation appear to affect the monopoly right conferred by a Nigerian patent. First, S.6(3) (a) seems to water down a patent monopoly right by the fact that it limits it to acts done for industrial or commercial purposes. So that the use of a patented invention for scientific research, educational purposes or strictly personal use is not covered by the exclusive right. Secondly, it does not cover acts done in connection with a product covered by a patent after it has been lawfully sold in Nigeria. (S.6(3)(b)). This is to enable the unhindered circulation of patented products in the country. By the adoption of the doctrine of "exhaustion" the patentee cannot, after the sale of his product, prevent anyone else from buying up that product and selling it in Nigeria or any other country. However, if a provision for a special application of the product is made by the patent then the said special application shall continue to be reserved to the patentee. The provisions of S.6(3) are based on S.23 of the BIRPI Model Law and continued by S.136 of the WIPO's.

The third possible significant limitation is provided by S.6(4) of the Decree which is derived from S.24 of the BIRPI Model Law. The former provides that:

> Where, at the date of the filing of a patent application in respect of a product or process or at the date of a foreign priority validly claimed in respect of the application, a person other than the applicant -
>
> (a) was conducting an undertaking in Nigeria, and
>
> (b) in good faith and for the purposes of the undertaking, was manufacturing the product or

> applying the process or had made serious preparations with a view to doing so,
>
> then, notwithstanding the grant of a patent, there shall exist a right (exercisable by the person for the time being conducting the undertaking, and not otherwise) to continue the manufacture or application, or to continue and complete the preparations and thereafter undertake the manufacture or application, as the case may be, and in respect of any resulting products to do any other act mentioned in subsection (1) above.

The raison d'etre of this provision is to avoid prejudicing any local industrial investment by a person for the exploitation of an invention which, subsequently, becomes patented by another person (See BIRPI, 1965, 46 and WIPO, 1979, 86). S.6(4) seeks to forestall the situation whereby a third party having invested so much time and money in a given project, who was already in good faith exploiting or about to commence the exploitation of a given invention should be frustrated or denied any rewards simply because a statutory inventor or an applicant claiming priority was first to file an application for it. It thus endeavours to give some protection to industrialists who may contribute to the economic and technological development of Nigeria.

It is instructive to note, as the commentaries on the relevant provisions of both BIRPI and WIPO Model Laws (infra) rightly indicate, that if at the appropriate date, that is, at the filing, or where appropriate, the priority date, the invention was disclosed to the public either by its use or in any other way in the country, then the

invention cannot be considered novel any longer and thus not qualified for a patent. However, if the use preceding either the filing or priority date was non-public use, that is, the invention was not made available to the public within the meaning of S.1, then the novelty will not be affected and a patent may be granted. It must be noted that in both cases, that is public or non-public use, S.6(4) protects the "prior user" if he was of good faith. As regards public use the provision enables him to continue the exploitation of the invention without having to institute nullity proceedings under S.9 of the Decree. In the case of non-public use the provision again allows the "prior user" to continue this exploitation notwithstanding the validity of the patent. In other words, as the commentaries on the two Model Laws (that is the BIRP and WIPO's) put it "as far as the 'prior user' is concerned, it is a matter of indifference whether there is a valid patent or not: his right to continue the use is the same in both situations".

For the purposes of S.6(4) a prior user shall not be deemed to have acted in good faith if he procured the information concerning the invention without the permission of the applicant or, although having got the information with the applicant's authorization, did not also obtain the latter's permission to commence the working of the invention.

The acts which enable a person to benefit from the provisions of S.6(4) are those of manufacturing a product and utilising a process as well as preparation for these acts. They do not cover the acts of merely importing, offering for sale, selling, using, or stocking of products since the objective of the provision is to protect domestic industrial investment. It is imperative to note that the rights

derived from prior manufacture or use do not only permit the beneficiary to manufacture locally the product but also to sell and use the product so manufactured. S.6(4), as already mentioned, is derived from S.24 of the BIRPI Model Law which has been continued by S.137 of the WIPO Model Law. It is surprising that the provision which appears to be quite useful especially for LDCs is not adopted by the ESARIPO Model Law.

Transfer of Rights in Technical Knowledge

The Decree provides for certain modes through which a patentee can transfer either all or some of his rights to another. These include assignment (S.24), licences of right (S.10), compulsory licences (Schedule 1, Part 1), and contractual licences (S.23). The provisions in the Decree on all these do not present any major striking dissimilarities between the patent law of Nigeria and that of other convention countries. Nevertheless, there are some provisions under contractual licences which do not only raise a number of fundamental issues but depart from the approach adopted by some convention countries as well as other countries with a patent system.

In respect of contractual licences S.23(3) of the Decree rightly declares any clause in such licences which imposes on the licensee in the industrial or commercial field restrictions not deriving from the rights conferred by the patent null and void. This implies that the licence agreement as a whole and other clauses in the agreement are not, as a rule, void. It may, however, emerge that the clauses liable to be declared null and void are so fundamental to the contract that without them it cannot subsist. In that case the entire contract may

be invalidated by the courts on the basis of the general rules of the law of contract. It must be noted that the section contains only a general rule prohibiting certain restrictions some of which include tie-in, export restrictions not necessitated by limitation of existing patents and restrictions on licensees not to sell competing products not infringing the licenseed patent[11].

S.23(3) is based on S.33(1) of the BIRPI Model Law. The Model Law committee apparently devoted particular attention to this section and it was observed, during discussion, that countries which already had adequate anti-trust regulations to combat restrictions on free competition would not need in their patent laws such a provision. On the contrary, for countries, including a number of LDCs, which did not have any anti-trust regulations it was advised that they could include the provision in their patent law. (BIRPI, 1965, 56). So Nigeria did.

However, S.33(2) of the BIRPI Model Law adopted by the provisos to S.23(3) of the Decree permits restrictions which are considered unlawful in a number of developed countries including the U.S. and member countries of the E.E.C., as well as some LDCs, but considered by the BIRPI as lawful restrictions which are most usual.

The first proviso to S.23(3) permits in a licence agreement "limitations concerning the scope, extent, territory or duration of the exploitation of the patent... or the quality or quantity of the products in connection with which the patent... may be exploited". The second proviso relates to the possible permission of a no-challenge clause (supra). Finally, the third proviso also enables the licensor to introduce into a licence agreement "limitations justified by the interest of the licensor in the technically efficient

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11. These are some of the examples contained in the Commentary on S.33(1) of the BIRPI Model Law (See BIRPI, 1965, 56).

exploitation of the subject of the patent...". Though this proviso may appear justified it is too broad and general, and stands the possible chance of abuse. Clearly, some of these limitations are anti-competitive and others could be convenient back-doors for licensors to introduce other limitations not anticipated by the Decree but which they may consider necessary. It does not seem surprising to find such restrictive provisions in a patent law in view of the monopoly nature of patent. In fact, they express the problem of monopoly grant.

It is clear from the above that the Nigerian patent law compared with the Ghanaian may appear more acceptable, especially in respect of its provisions for the domestic application and procedure for obtaining a patent in Nigeria, and the ease with which Nigerian inventors are able to procure patent grants. The Decree also provides a comprehensive patent law for the country and makes provisions for measures such as compulsory licences. Despite this comprehensiveness and the provisions to check patent abuses the majority of patents registered in Nigeria, as we shall see in Chapter 7, are not worked, and the patent system, as we shall also see in the same chapter, is employed to include restrictive practices in patent licensing and technology transfer transactions. It is in this regard that the relevance of S.23(3) is brought into question. Section 23(3) of Decree No. 60 which before 1979 seemed to be the only relevant legal provision on patent licensing appears, besides the few exceptions, to have encouraged the inclusion of a number of restrictive practices in licensing agreements involving Nigerian licensees. It is, therefore, a welcome relief that the National Office of Industrial Property Decree 1979 was introduced that year to combat these anticompetitive practices.

National Office of Industrial Property Decree 1979 (Decree No. 70) and Technology Transfer Regulation in Nigeria

The birth of both the National Office for Industrial Property Decree 1979 (Decree No. 70) and the National Office for Industrial Property (NOIP) set up by the Decree is the result of the combined efforts of both the United Nations Development Programme (UNDP) and the United Nations Economic Commission for Africa (UNECA).

In the wake of the increased influx of foreign investors and inflow of foreign technology into Nigeria spurred by the country's oil boom in the mid-1970's the UNDP came to recognise the need for that country to regulate the activities of these investors, particularly the terms and practices associated with the transfer of technology. While the UNDP provided the expertise and developed the necessary modalities and proposals in this direction, the influential UNECA served as the channel through which all these were funnelled to the Nigerian government. The latter in considering the merits of the proposals vis-a-vis the country's balance of payment position, which had then started to reflect the extra pressures on it which included fees and royalty payments to foreign technology suppliers, accepted these proposals and the need to set up a centralised office to control technology transfer to Nigeria.

Consequently, Decree No. 70 of 1979 was promulgated on 25 September 1979 and came into effect in 1980. The Decree, it has been suggested, particularly with respect to its provisions on the evaluation and registration of licence agreements, is an adoption of the Volume II of the WIPO Model Law for Developing Countries on Inventions (Date-Bah, 1981, 89). While there is, in fact, a very

close similarity between the Decree's provisions relating to the examination and registration of licensing contracts and the WIPO Model Law's corresponding provisions this does not, however, seem to be the case because the Decree was promulgated in 1979, a year before the WIPO Model Law was completed and published. It may be appropriate, nevertheless, to mention that the Decree seems to follow very closely the 1972 Mexican law on the transfer of technology which has now been repealed by the 1981 law on the subject. In fact, the similarity between the two laws in terms of content and statutory arrangement is so close that it makes it difficult to avoid the inference that the Decree could possibly have been greatly influenced by the Mexican law.

The NOIP Decree is the main law which provides both the legal and institutional framework for regulating the transfer of technology to Nigeria. It established the National Office of Industrial Property (NOIP) as the main administrative authority for this purpose. It is instructive to point out here that the Decree does not cover FDIs. Unlike the Ghanaian approach, FDIs in Nigeria are regulated by separate enactments and policies, and administered by different bodies created by these enactments and policies. Among these are the Nigerian Enterprises Promotion Decrees 1972 (No. 4 of 1972) and 1977 (No. 3 of 1977), a series of Five-Year Development Plans and other industrial policies and strategies. This means that the integrated regulatory approach for both FDI and the transfer of technology is not practised in Nigeria.

The Establishment and Functions of the Office of Industrial Property (NOIP)

Section 1 of Decree No. 70 of 1979 establishes the NOIP. The

latter is governed by a body known as the Governing Council (S.2(1)). This Council is responsible for the formulation of policy for the NOIP and for the discharge of other functions conferred on it by the Decree. It is composed of a Chairman who shall be the Permanent Secretary of the Federal Ministry of Industries or any such officer of that Ministry not below the rank of Principal Secretary as may be designated by the Permanent Secretary, one representative each from the Federal Ministries of Economic Development, Finance, Internal Affairs, Justice, Trade, and Works and Housing. Also included in the composition of the Council is one representative from the National Science and Technology Development Agency, and, in addition, one representative each of the Universities, and Polytechnics and Colleges of Technology in Nigeria, both appointed by the Federal Commissioner of Industries after the requisite consultations. The Director of the NOIP who is its chief executive officer is also a member of the Governing Council (S.2(2)). It may be added that S.2(3) of the Schedule to the Decree permits the Council to co-opt any person whose advice it may desire on a particular matter for such period as it thinks fit. Similarly S.3(2) of the Schedule makes it possible for committees of the Council to be composed of persons who may not be members of the Council. Both provisions are significant in the sense that they may make available to both the Council and possibly the NOIP itself expertise which they may lack in the execution of their functions.

The functions of the NOIP as provided by S.4 of Decree No. 70 of 1979 include the encouragement of a more efficient process for identifying, selecting and acquiring foreign technology, the development of the negotiating skills of Nigerians entering into

agreements involving the transfer of foreign technology, and the provision of a more efficient process for the adaptation and use of imported technology. Another important function of the NOIP is the registration of all contracts which at the date of the coming into force of the Decree are still valid as well as those entered into after the Decree came into effect.[12] Such contracts must wholly or partially concern the use of trademarks, licence to use patented inventions, the supply of technical expertise, basic or detailed engineering, or machinery and plant, the provision of staff or managerial assistance and the training of personnel. Finally, the NOIP also monitors, on a continuous basis, the execution of such registered contracts.

It is obvious that the NOIP appears to concentrate its efforts on the core issue of the technology aspect, its effective transfer and adaptation in all licensing transactions. The effective execution of the above functions may, however, be impeded by factors such as inadequate personnel and resources. Nevertheless, it is significant that the Decree highlights the need to undertake the above exercises which most LDCs relegate to the background. It may be mentioned here in respect of the registration exercise that a NOIP guideline excludes from such exercise purchase agreements involving the imports of machinery and equipment unless foreign personnel are used in their

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12. According to S.5(1) and (2) all the pre-Decree contracts entered into by any person in Nigeria are to be registered within six months from the commencing date of the Decree while the post-Decree contracts entered into by any person in Nigeria and outside it are to be registered within 60 days from the date of their execution or conclusion.

execution. This exclusion may seem to be inappropriate because of the practices associated with such agreements whereby clauses such as tie-ins are included. This may therefore encourage the embodiment of these clauses in such agreements and the NOIP may need to have a second look at the guideline.

Criteria For Evaluation of Agreements by NOIP

In evaluating all technology transfer agreements submitted for registration, the NOIP is guided essentially by the criteria laid down by S.6 of the Decree. Though other economic and technical considerations may influence the exercise. The section empowers the Director of the NOIP to refuse registration of any agreement which does not comply with the said criteria. S.6(2)(a) provides that the Director shall refuse the registration of any agreement which seeks to transfer technology which is freely available in Nigeria. This undoubtedly is to avoid the unnecessary duplication of technology which already exists in the country, and possibly the destruction in particular of indigenous technology by sophisticated foreign technologies. S.6(2)(a) is very similar to article 7(1) of the Mexican law on transfer of technology (1972) which is continued by Article 16(1) of the 1981 law. According to S.6(2)(b), which is almost the same as Article 7(ii) of the 1972 Mexican law, any agreement in which the price or other valuable consideration is not commensurate with the technology acquired or to be acquired will equally be refused registration. In the same vein, agreements which impose excessive and unreasonable controls on transferee's operation (S.6(2) (c)(h)(i) and (k)) as well as those which oblige the acquiring party to submit to

foreign jurisdiction for dispute settlement (S.6(2)(r)) are also not entitled to be registered.

Other mandatory requirements which are to be met by all technology transfer agreements before they can be registered by the NOIP include the exclusion from such contracts of limitations on R & D, grant-back clauses, tie-ins and export restrictions.

S.6(2)(e) forbids the inclusion in technology transfer agreements involving Nigerian licensees of any covenant which has the prime aim of restraining them from undertaking further research and development regarding the licensed technology. Similarly, the same provision prohibits any covenant which requires the consent of the licensor before any adaptation of the technology to local conditions could be carried out. Though the occurence of such clauses in technology agreements involving Nigerian licensees is, as we shall see in the next chapter, minimal it is important that the Decree should seek their entire expunction from technology agreements because of the inhibiting effect they may have on licensees' research directed to the adaptation and modification of foreign patented technology to the domestic environment and the fact that such consent could be unreasonably refused.

It is important to note, however, that any debilitating effect of these clauses on industrial activities of licensees and on the economy of Nigeria would be crucial only if there existed in the country the requisite pool of technical personnel to undertake the required R & D and modification and adaptation of the licensed technology to the needs of the country.

In addition, grant-back clauses are also excluded from technology transfer agreements by the NOIP Decree. S.6(2)(d) of the

Decree, like Article 7(iv) of the Mexican law on transfer of technology and Article 20(e) of Decision 24 of the Andean Pact, prohibits grant-back or improvement clauses. This means that any licensing agreement involving a Nigerian licensee which embodies such clauses will not qualify for registration. While the Nigerian law, though it is not always so in actual practice as we shall see in the next chapter, rejects grant-back clauses generally, a number of LDCs including Argentine, Brazil and the Philippines, as well as the WIPO Model Law on the subject (See S.305(vii) of WIPO Model Law, Vol. II) consider it reasonable as long as it is reciprocal or it includes appropriate consideration. The close similarity between the Nigerian law and the 1972 Mexican law is made clear by the provisions of Article 7(iv) of the latter which obliged the Ministry of Industry and Trade not to register agreements "where patents, trade-names, trade-marks, innovations or improvements obtained by the technology buyer are required to be transferred with or without compensation, to the technology supplier". This provision has, however, been modified by Article 15(ii) of the 1981 law on the control and registration of the transfer of technology and the use and exploitation of patents and trade-marks which permits grant-backs only on the condition that "there is reciprocity or a benefit" for the technology acquirer in the exchange of the information.

Similarly, it is instructive to note that any inhibiting effect of grant-backs on the industrial activities of Nigerian licensees and other LDCs will be crucial only if there exists a sufficiently competent technical expertise in these countries capable of undertaking the necessary R & D in order not only to modify and adapt foreign technology to the environment and needs of the respective

countries but also to make sufficient improvement to the licensed technology as well as to develop new ones.

Another restrictive covenant which is not permitted by the Decree is the tied-purchase clause. S.6(2)(f) of the Decree, like Article 7(vi) of the 1972 Mexican law continued by Article 15(iv) of the 1981 law, makes it unacceptable for a transferer of technology to obligate a Nigerian licensee to acquire other inputs exclusively from him or his designated source. Similarly, S.6(2)(q) prohibits any requirement for the licensee to accept from the licensor additional technology which he does not require. All these are contained in the WIPO Model Law and the corresponding provisions are S.305 (i) (iii) (xiii) and (x) respectively. It may be noted that while the Mexican laws prohibit tied-purchase clause they, unlike the Nigerian law, do not go further to provide explicitly on the issue of unrequired additional technology.

The frequency of tie-in clauses in licensing transactions involving Nigerian licensees is not, as will be discerned in Chapter 7, alarming. Nevertheless, its elimination by the Decree is very significant if Nigerian enterprises are to be able to operate freely within the international technology market without being hindered by the obstacles inherent in such clauses (supra).

Finally, the Decree by virtue of S.6(2)(g) forbids transferors of technology to impose any export restrictions on their Nigerian recipients. This provision follows that of Article 7(vii) of the 1972 Mexican law which is continued by Article 15(v) of the 1981 law. The Nigerian law, it will appear, prohibits export restriction entirely. However, in actual practice, as will become clear in the next chapter, this is not the case. So that while the NOIP Decree may in this respect differ theoretically from the WIPO Model Law provision (S.305 (i) (ix)) it may not be so in actual practice.

From the above it is evident that Nigeria, like some third world countries including Mexico, Brazil, the Andean pact countries and India, has explicitly outlawed restrictive practices in international technology transfer transactions involving its nationals. It, therefore, approves only of agreements which do not embody any of the above mentioned restrictive practices and for which a certificate of registration is issued.

Certificate of Registration

A certificate of registration is issued in respect of agreements which are not only free of the above mentioned restrictions but conform to the criteria provided by S.6(2) of the Decree. This is, however, subject to S.6(3) which enables the issuance of a certificate to an applicant notwithstanding any convergence between the terms and conditions of an agreement and the specifications laid down in S.6(2) if it is in the national interest so to do. Such a certificate is denied to agreements which do not conform to the said specifications and thus not approved by the NOIP. The significance of this certificate is brought out by S.7 of the Decree. According to the section:

> ..... no payment shall be made in Nigeria to the credit of any person outside Nigeria by or on the authority of the Federal Ministry of Finance, the Central Bank of Nigeria or any licensed bank in Nigeria in respect of any payments due under a contract or agreement mentioned in Section 4(d) of this Decree, unless a certificate of registration

> issued under this Decree is presented by the party or parties concerned together with a copy of the contract or agreement certified by the National Office in that behalf

Clearly, the non-issuance of certificates of registration to any agreements means that no payments in foreign currency can be made in respect of such agreements or parties thereto. This non-authorisation of foreign currency payment which seems to be the only sanction attached to the embodiment of restrictive practices in technology transfer contracts demonstrates one of the underpinning considerations for the promulgation of the Decree. This is in contradistinction to the sanction provided under the Ghanaian law (supra) and both the previous and current Mexican laws (Articles 6 and 11 of the 1972 and 1981 laws respectively) which render the entire contract null and void. This means that such contracts in the latter countries cannot be enforced in the courts of law. This does not, however, seem to be so under the Nigerian law.

Conclusion

Nigeria, unlike Ghana, has, since 1970, ceased to operate under the colonial patent ordinance which it inherited after independence. Instead it promulgated in that year its own autonomous and comprehensive patent law which governs the administration of patents in the country. This law, as has already been mentioned, is modelled on the BIRPI Model Law which has been revised by the WIPO Model Law, and Nigeria may not only need to revise its law so as to catch up with

recent developments in the field as reflected in the provisions of the WIPO Model Law and those of the ESARIPO, some of which it need not, however, bother to consider (supra), but to make them more relevant to its situation.

In the area of technology transfer regulation a significant development took place in 1979 with the promulgation of the NOIP Decree. This decree, whose enactment was contributed to by foreign exchange consideration, set up an administrative authority, the NOIP, to administer it as well as to regulate, independent of FDIs, the transfer of technology into Nigeria. It, accordingly, established a criterion to be used in the approval of technology agreements by the NOIP. This criterion seeks to exclude from approval and registration, and, thus, the denial of a certificate of registration all technology transfer agreements which embody certain defined restrictive practices and those which do not, in general, meet the said criterion. It is the implementation and the effects of this decree as well as those relating to patents which we intend to assess in the next chapter.

CHAPTER 7

THE NIGERIAN PATENT SYSTEM AND THE TRANSFER OF TECHNOLOGY: PRACTICE

Introduction

In this chapter we shall endeavour to evaluate some of the consequences of the Nigerian patent regime which will include its effects on domestic patenting activity, as well as the effects of the NOIP Decree. In addition, we intend to examine their efficiency in transferring technology to Nigeria. The assessment of the effects of the NOIP Decree and activities of the NOIP in the regulation of the transfer of technology will also be made.

Effects of Decree No. 60 of 1970

The main effect of Decree No. 60 is that it has contributed to an increased participation by residents in patenting activity in the country. Though there may be, in this respect, other contributing factors such as increased R & D personnel since 1970 when the Decree was promulgated, the change in the then existing system (supra) which has made it much easier and less costly, especially for Nigerian inventors, to obtain a Nigerian patent could be argued to be the major factor responsible for the increased participation in this activity by residents of the country. Tables 7:2 and 7:3 as compared with table 7:1 demonstrate that the domestic inventors' share of Nigerian patents, though minimal, generally increased after Decree No. 60 came into force.

It is important to note that some of these domestic Nigerian inventions are of great industrial and agricultural significance and have also succeeded in procuring patents in other countries including

Table 7:1

Patents Granted

YEAR	RESIDENTS	NON-RESIDENTS	PERCENTAGE
1964	-	124	Nil
1965	-	122	Nil
1966	-	145	Nil
1967	-	188	Nil
1968	-	136	Nil
1969	3	131	2.3
TOTAL	3	846	Ø.35

SOURCE: Based on information provided by the Office of Trade-marks, Patents and Designs, Lagos

Table 7:2

Patents Granted

YEAR	RESIDENTS	NON-RESIDENTS	PERCENTAGE
1972	11	211	5.2
1973	11	446	2.5
1974	11	344	3.2
1975	6	411	1.5
TOTAL	39	1412	3.1

SOURCE: Based on information provided by the Office of Trade-marks, Patents and Designs, Lagos

Table 7:3

Patents Granted

YEAR	RESIDENTS	NON-RESIDENTS	PERCENTAGE
1978	8	448	1.78
1979	13	438	2.96
1980	8	448	1.78
1981	8	591	1.35
1982	12	540	2.22
1983	18	468	3.84
1984	19	377	5.03
TOTAL	86	3,310	2.59

SOURCE: Based on information provided by the Office of Trade-marks, Patents and Designs, Lagos

the U.K. and Ghana. Examples of these inventions include the "portable planter" developed by Moses Ige which is used for sowing grain and is well suited to the use of small-scale farmers and researchers in agricultural institutions, and the "device for planting stem cuttings" developed by one Gabriel Makanjoula which is used for planting stem cuttings, in particular cassava stem cuttings and those of plants similarly propagated. Patents for both inventions were obtained by the University of Ife, Nigeria.

However, a critical examination of some of the domestic inventions, such as the "Nairawise self-service hair trimming set" already referred to, the "4 in ONE Mattress", and the "bed seater" reveals that a significant number of them are not only of no industrial applicability and inventive step but are equally of no great industrial importance, and, thus, reduces the significance of the Nigerian share of inventions registered in the country. The ability of such unmeritorious inventions to secure patent grants is essentially due to the adoption of the registration system of examination by that country.

The adoption of this system of examination by Nigeria may, as already indicated, be attributable to the dearth of technical manpower available to undertake the necessary investigations. However, the answer, it will appear, is not the complete renunciation of a thorough examination function. Though Nigeria may not abound in manpower resources it has, nevertheless, at least a sufficient technological capacity to enable selective examination of patent applications as to substance. In the case of inventions which it cannot examine as to substance it could assign them for examination to say an international preliminary examining authority like the one established under the Patent Co-operation Treaty

(P.C.T.) or possibly to the Austrian and other Patent Offices, which carry out a number of searches for developing countries free of charge. In effect, we are suggesting that on the basis of the above Nigeria should be able to examine as to substance all inventions registered in that country.

Accordingly, it will be proposed for the possible adoption by Nigeria of the ESARIPO's recommendations on the subject whereby a minister or possibly any competent body may be authorised to direct by legislative instrument that applications for patents relating to a specified technical field or fields or indeed all patent applications are to be subjected to examination as to substance (See S.23 of the ESARIPO Model Law and the commentary thereon). This will obviously, give the Minister or the competent authority a desirable degree of flexibility in dealing with the thorny issue of patent examination, taking into consideration the available facilities and manpower resources. Similarly, it will also give the Patent Office the right to transmit a patent application to any authority, as may have been designated in regulations covering the matter, to undertake a preliminary examination of the patentability of the invention claimed. The authority envisaged here in the case of Nigeria could be the Nigerian Council for Industrial and Scientific Research or the various science, engineering or technology departments of its universities. The other authority or bodies envisaged by the Model Law could be the Regional Office of ESARIPO based in Harare, Zimbabwe which is yet to start serious work in respect of patent examination or an international preliminary examining authority such as the one established by the PCT.

The adoption of such an approach would enable the Nigerian Patent Office to exclude all unmeritorious inventions, and, thus, enable it to reward only the inventions which could contribute significantly to the industrialisation process of the country. In addition, it may also assist the Patent Office to sieve out from registration foreign inventions which may either not constitute a generative technology transfer or may fall under certain excluded technical fields.

Another consequence of the introduction of Decree No. 60, it will seem, as illustrated by both tables 7:4 and 7:5, is the increased volume of patent applications made in Nigeria. During the four year period immediately preceding the promulgation of the Decree the total number of patents filed was only 603 as compared with 1456 patent applications filed within the first four years after the Decree had come into effect. Though other possible factors could have contributed to this increase the ease with which patent applications can now be made which is attributable to the Decree and the adopted registration system of examination which enables every conceivable invention which satisfies the statutory requirements to obtain a patent grant seem to offer a much better explanation for this increase.

In spite of the increased volume of registered patents and importantly the growth in the share of Nigerian inventors the Decree has not been sufficient to reduce the dominant position of foreign inventors in the patenting activity in the country.

Patenting Activity

On the whole, patenting activity in Nigeria, as revealed by tables 7:1, 7:2 and 7:3, is dominated by foreign inventors. Table 7:6

Table 7:4

Patent Applications Filed 1964-1969

Country of Origin	1964	1965	1966	1967	1968	1969
U.K.	39	36	68	85	44	39
U.S.A.	36	30	36	43	42	46
Switzerland	12	16	9	11	11	11
W. Germany	6	10	3	12	12	10
Italy	1	7	1	3	-	2
Bahamas	6	2	2	3	3	1
Netherlands	12	10	19	8	11	9
Ireland	1	1	-	1	1	-
Australia	3	-	-	3	1	4
Canada	2	1	1	2	-	-
Sweden	1	1	-	1	-	1
France	4	2	1	5	3	2
Channel Islands	1	1	-	-	-	-
Belgium	-	1	1	4	-	-
Luxembourg	-	1	1	-	-	-
Spain	-	2	1	-	-	-
Greece	-	1	-	-	-	-
Norway	-	-	1	1	-	-
Japan	-	-	1	3	3	1
Panama	-	-	-	1	-	1
Malaysia	-	-	-	2	2	2
Austria	-	-	-	-	1	-
South Africa	-	-	-	-	1	1
Ivory Coast	-	-	-	-	1	-
Nigeria	-	-	-	-	-	3
TOTAL	124	122	145	188	136	134

SOURCE: Based on Information provided by the Office of Trade-Marks, Patents and Designs, Lagos.

Table 7:5

Patent Applications Filed 1972-1975

Country of Origin	1972*	1973	1974	1975
U.K.	48	157	70	76
U.S.A.	92	108	106	118
Switzerland	3	37	38	34
W. Germany	20	35	47	54
France	15	19	17	59
Italy	13	22	4	10
Netherlands	9	26	14	10
Nigeria	11	11	11	6
Belgium	2	4	3	7
Poland	1	1	-	1
Hungary	2	3	2	2
Japan	3	14	8	12
Spain	3	1	1	3
Canada	-	5	10	9
Sweden	-	1	5	-
Lebanon	-	1	-	-
Portugal	-	2	-	-
Panama	-	1	-	-
Norway	-	1	4	4
Yugoslavia	-	2	-	2
Malaysia	-	5	2	1
Greece	-	1	-	1
Israel	-	-	1	-
Hong Kong	-	-	2	1
Liechenstein	-	-	1	2
S. Africa	-	-	3	1
Mecariques	-	-	1	-
Australia	-	-	2	3
Ivory Coast	-	-	1	-
Senegal	-	-	2	
-Bahamas	-	-	-	2
Austria	-	-	-	2
Denmark	-	-	-	1
Bulgaria	-	-	-	1
TOTAL	222	457	355	422

SOURCE: Based on information provided by the Office of Trade-marks, Patents and Designs, Min. of Trades & Commerce, Lagos.

Note: * Due to the incompleteness of the available information provided the data here should be considered only as an approximation.

Table 7:6
Patent Applications Filed 1978-1984

Country of Origin	1978	1979	1980	1981	1982	1983	1984
U.K.	93	83	79	103	98	106	62
U.S.A.	108	140	144	201	190	180	156
Switzerland	38	40	40	35	22	30	39
W. Germany	44	35	29	54	69	28	17
France	60	35	59	44	55	40	39
Belgium	6	6	2	10	9	1	3
Netherlands	29	15	17	19	14	19	20
Norway	1	-	1	2	1	3	1
Sweden	6	3	4	15	14	13	9
Denmark	3	3	2	3	4	3	-
Japan	12	13	6	11	8	6	5
Italy	22	11	17	46	16	6	4
Bahamas	2	6	5	-	-	-	-
Nigeria	8	13	8	8	12	18	19
Spain	1	8	1	6	9	4	-
Ivory Coast	2	-	1	-	-	-	-
Hungary	1	3	7	14	3	2	4
Channel Islands	1	-	1	3	-	-	-
Panama	6	3	6	1	5	5	6
Finland	1	-	1	1	1	1	-
Poland	1	2	1	-	-	-	-
Austria	1	2	3	3	-	-	-
Hong Kong	1	-	1	-	1	-	-
Brazil	1	-	1	3	1	1	-
U.S.S.R.	1	6	3	-	1	-	-
Liechtenstein	1	-	2	-	-	-	-
Mexico	1	-	4	2	-	-	2
Australia	1	4	1	4	1	4	3
Luxembourg	1	-	1	2	-	-	-
Ireland	2	-	-	-	-	-	-
Canada	1	11	4	2	5	4	5
Malaysia	-	1	1	-	1	-	1
Bermuda	-	1	1	-	-	1	-
Israel	-	1	-	-	-	3	1
Cayman	-	1	-	-	1	-	-
Argentina	-	1	-	-	-	-	-
Cuba	-	2	-	-	-	-	-
Taiwan	-	1	-	1	1	-	-
N. Zealand	-	1	1	-	-	-	-
Egypt	-	-	-	1	-	-	-
Brit. West. Indies	-	-	-	2	2	-	-
S. Korea	-	-	1	1	3	2	-
Zimbabwe	-	-	-	1	1	1	-
China	-	-	-	1	-	-	-
Portugal	-	-	1	-	-	-	-
Yugoslavia	-	-	-	-	4	-	-
Mauren	-	-	-	-	-	1	-
Jamaica	-	-	-	-	-	1	-
Greece	-	-	-	-	-	1	-
South Africa	-	-	-	-	-	1	-
Bulgaria	-	-	-	-	-	1	-
TOTAL	456	451	456	599	552	486	396

SOURCE: Based on Information provided by the Office of Trade-marks, Patents and Designs, Lagos.

as well as tables 7:4 and 7:5 illustrate the sources of the inventions registered in the country. As the tables demonstrate the two major countries which account for patents filed in Nigeria are the U.K. and the U.S. The three tables make a very interesting revelation in this respect. It will be discerned from table 7:4 that between 1964 and 1968, that is, before the introduction of the 1970 Patent Decree, the U.K. filed more patents in Nigeria than the U.S. However, from 1970 onwards after the dependent legislation was repealed and substituted by an autonomous one, the U.S. began to file more patents than the U.K. This development could possibly be explained by the ease and simplicity with which U.S. inventors are able, with effect from 1970, to procure patent grants in Nigeria. It could also be possibly attributed to U.S. technological superiority. All this may not, however, adequately explain this development.

The dominance by the U.S. and the U.K. in patenting activity in Nigeria is illustrated by table 7:6. As the table demonstrates both countries accounted for over one half of all patents filed in Nigeria between 1978 and 1984. In fact, they took between them a total share of 51.32% of all inventions filed during that period, with the U.S. being responsible for as much as 32.95%. Thus the latter alone accounted for almost one third of all inventions filed in Nigeria during the period under consideration. It is also pertinent to note that out of a total of 51 countries that filed inventions in the country during that period 5 western industrialised countries, namely the U.S., U.K., France, West Germany and Switzerland accounted for 76.41% of all inventions registered. This is almost tantamount to a monopoly by these countries of the patenting activity in Nigeria.

On the contrary, all the African countries which filed patents in the country during the period under consideration took a total share of only 2.76%, with Nigeria, the host country, accounting for 2.53%. Though the Nigerian share appears to be minimal it is an improvement upon the pre-1970's. It does seem, however, from its share that though the Decree has made it easier for the procurement of patents in the country the necessary infrastructure for stepping up domestic inventive activity seems to be either lacking or not adequately provided for. It may be observed that the percentage share of other African countries (excluding Nigeria) which filed inventions in Nigeria between 1978 and 1984 stood insignificantly at 0.23. This is demonstrative of the almost non-existent technological trade and co-operation between African countries which may be explained by poverty in technical manpower resources and R & D infrastructures which is characteristic of these countries.

It is clear from the above that patenting activity in Nigeria is dominated by foreign patentees, particularly those of Western Europe. Nevertheless, in spite of this and the limited participation by Nigerian inventors in this activity the totality of inventions registered in the country may still contribute to assist in the transfer of technology to the country and it will be relevant to evaluate the success of the Nigerian patent system in this respect.

The Nigerian Patent System and the Transfer of Technology

In assessing the success of the Nigerian patent system in the transfer of technology to that country the factors that may be taken into consideration will include the efficacy of the system in the disclosure, spread or diffusion of new technical knowledge, its

influence on the inflow of patented goods, and its effects on FDIs, joint-ventures and patent licensing.

In considering the dissemination of technical knowledge as technology transfer, it could be argued that the Nigerian patent system has not been very successful in that respect. This may not, necessarily, be blamed on the patent system itself but mainly on the administration of the system by the Nigerian Patent Office. Since its establishment the latter, like the Ghanaian, has been performing the function of only registering inventions and ignoring the crucial role of serving as a technology data base. For example, it does not publish any patent journal giving the details of new inventions to the general public. Instead, the office simply publishes, in most cases, in the Government gazette details such as patent registration numbers, title of inventions, date of the grant, and names and addresses of patent attorneys who prosecuted them. In some few cases, as discovered by the author, some of these published details vary from those in the patent register. Moreover, a search at the Lagos Patent office, like Accra's, will hardly lead one anywhere because the files are, similarly, in the majority of cases, poorly filed or as in the case of fairly old ones generally dumped somewhere to rot.

As was made clear to the author by a number of officials in the Lagos Office, succeeding governments have neglected it to the extent that it lacks the necessary resources to perform the functions for which it was set up. For example, at one time when the Office's seal for trademarks and patents got spoilt it could not, for a period of two months, issue any certificates or grants because it did not have the money to carry out the repairs on the seal until a senior private legal practitioner came to the rescue of the office by providing the money for the repairs.[1] In addition to financial resources, office

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1. Interview by the author with the Senior Legal Office, Office of Trademarks, Patents and Industrial Designs, Lagos, December 1984.

space is the other problem confronting the patent office. This problem according to the same officials adversely affects the proper filing and storage of documents covering registered inventions.[2] It will, therefore, seem that until the Office receives the necessary resources and attention from the government, and in addition, develops and maintains it as technical information data base it will not be able to play any meaningful role in facilitating the transfer of technology to and its diffusion in Nigeria.

However, if the importation of patented products is accepted, as we endeavoured to indicate, as technology transfer, then the Nigerian patent system can be said to have transferred technology into the country. The majority of the registered patents in the country are "exploited" only through the importation into that country of their patented products. This, however, is not deemed by a number of LDCs to be exploitation of a patent. In fact, a great number of LDCs including Nigeria are more interested in the domestic working of inventions for which they confer patent monopoly privileges than the mere importation of patented products or those derived from patented processes. Nevertheless, the bulk of Nigerian registered patents are not locally exploited. Though there exist laws and regulations dealing with the domestic working of patents they are rarely applied.

It may be noted that there are few patents which have been exploited or are being exploited either through FDI or joint-ventures as in the case of Dunlop Nigerian Industries Limited and Michelin Limited. This, however, cannot be attributed mainly to the merits of the legal protection offered by patents. Such exploitations are, in fact, part and parcel of an entire investment package grounded on more compelling factors such as the large size of the Nigerian market. So

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2. Interview with senior officials, including the Senior Legal Officer, at the Office of Trademarks, Patents and Designs, Lagos, December 1984.

that patents per se have not been sufficient to spur on foreign inventors to exploit their inventions in Nigeria, and it could therefore be argued that they have not been very successful in effecting either through FDI or joint-ventures a transfer of technology.

Finally, patent licensing as a conduit for transferring technology is not very popular in Nigeria. In fact, licensing of patents as an independent transactions is very rare, and this may be explained by the dearth of technically competent indigenous Nigerian enterprises capable of working foreign patents independently. Consequently, any such transaction comes only as part of a more wide-ranging one which may encompass the licence of know-how as well as technical and management services agreements. The very few independent patent licensing transactions that take place in Nigeria are mainly those between foreign parent companies and their subsidiaries in that country.

Nevertheless, patents are used by foreign licensors to introduce into technology licensing agreements involving Nigerians restrictive and anticompetitive practices. As indicated by table 7:7 these practices are still embodied in technology transfer agreements involving Nigerian licensee firms, and it is in this respect that we embark on the examination of the performance of the NOIP since its establishment in eliminating these practices as well as the general regulation of the transfer of technology.

The National Office for Industrial Property (NOIP) and Regulation of The Transfer of Technology

Before the establishment of the NOIP there had not been any well defined control over technology transfer contracts in Nigeria, other than broad policy guidelines in respect of appropriate levels of payments for technical services, and royalties for use of industrial property rights including patents. This state of affairs has, since the birth of the NOIP, been considerably altered. The latter has, since its establishment, been examining technology transfer contracts, besides the consideration therefor, in terms of the technology content and the inclusion of anticompetitive practices which hinder the effective transfer of technology, and has, accordingly, rejected contracts which contain such practices.

It is the objective of the NOIP, within the ambit of Decree No. 70 of 1979, to expunge all restrictive clauses as far as possible. The NOIP, as we shall see very shortly, seems, to a considerable extent, to have succeeded in this direction, but has on occasion in view of the technological and economic significance of certain projects, confined itself to rejecting the least acceptable restrictions. This is permitted by S.6(3) of the Decree, and closely follows the practices in and laws of Mexico and the Philippines. The National Office has, for the same reason, on rare occasions registered some agreement which embody serious restrictive practices. Similarly, on equally rare occasions the NOIP, as one senior official admitted, has been pressurised to approve of agreements which included restrictions prohibited by the Decree but of no particular technological or economic importance[3].

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3. Interview with a Senior Official at the NOIP, Lagos, December 1984.

In carrying out the legal criteria laid down by the Decree the NOIP has in particular refused to accept restrictions on R & D in relation to the licensed technology. These restrictions, as table 7:7 reveals, are minimal. However, it is significant, in view of their inhibiting effects, that the National office should seek their exclusion from such transactions. It is instructive to note, as has already been observed, that any adverse effects of these restrictions on the industrial activities of licensee firms and on the economy of Nigeria would be significant only if there existed the necessary technical manpower and other related resources to undertake R & D directed to the needs of the country.

Available evidence, however, suggests that these clauses may not have much real adverse impact on indigenous enterprises' R & D and adaptation of foreign technology because of the country's weak technical and scientific manpower base. For example, out of a total population of 66,628,000 as estimated in 1977 (See UNESCO Annual Statistical Yearbook, 1978/79) there were only 35,126 potential scientists, engineers and technicians and only 3,545 actually engaged in R & D during the same year (UNESCO, Annual Statistical Yearbook, 1983) which is almost equivalent to one-third of the number of such personnel engaged in R & D in Ghana (9,819 as estimated in 1976. Ibid) whose population is about one-seventh of Nigeria's. Similarly, in 1970 (the year for which figures are available) Nigeria spent only $33 million on R & D which was equivalent to 0.3% of its GNP. This clearly falls short of the target of 0.5% as recommended by the International Development Strategy II (IDSII). It may be added that out of a total projected capital expenditure of about N82 billion covering the fourth national development plan, 1981-1985 only N543,45

million, which represents Ø.66% of the latter was earmarked for R & D (Federal Republic of Nigeria, 1981). Though these figures virtually say nothing about the deployment capability of these numerical resources,[4] and, in addition, because of the limited period they cover and the fact that they, apart from those relating to the projected capital expenditure, are not very recent may not adequately reflect the country's R & D potential they are, nevertheless, demonstrative of it.

In recognition of the country's weak R & D potential the government has decided to give priority to high quality scientific education, and to equip adequately schools, colleges, technical institutions and the universities to provide the necessary manpower requirements (Fed. Rep. of Nigeria, 198Ø). In addition, the government has decided to evolve a system of technical training aimed at enabling young people to "imbibe the technological culture". Accordingly, it is revamping and reorganising the Industrial Training Fund (I.T.F.) established by the Industrial Training Fund Decree No. 47 of 1971 to promote and encourage the acquisition of skills in industry and commerce with a view to generating a pool of indigenous trained manpower sufficient to meet the needs of the country.

Furthermore, the government is intensifying its efforts to encourage R & D as well as to improve continually the quality of industrial products and processes. In this respect, it intends, in

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4. For example, as regards scientific and engineering manpower resource, Ukaegbu (1985) has demonstrated that, because of the absence of requisite infrastructure and equipment, available manpower resources are heavily under-utilised. So that the numerical strength of this resource may not mean very much.

addition to established government research institutes, to encourage each industrial establishment to maintain an efficient R & D division (ibid.). While this is laudable it is doubtful whether it can be effectively accomplished without difficulties in view of the resources required in setting up such units and the present economic problems confronting the country. It may be possible for some establishments to set up such units with considerable assistance from government, but it may be doubtful as to how many firms, especially the small ones, would be able to avail themselves of this opportunity if it should ever be a reality.

Finally, the government has also provided that expenses on R & D of firms which engage in research and development will be tax deductible, provided that they provide evidence to justify the purpose of the R & D effort vis-a-vis the normal operations of the industrial enterprise concerned, the R & D is done in-house or given to a recognised Nigerian research or consultancy organisation, and the fruits of the research are patented and protected in accordance with international accepted industrial property rights. It may also be added that the government has, in the same respect, decided to design a reward system which will adequately remunerate successful researchers, inventors and innovators. (Ibid.).

It is difficult to assess the effect of all these measures on indigenous R & D since most of them are yet to be put into effect. Nevertheless, it may be surmised that their effective implementation in conjunction with the complete elimination of R & D restrictions on indigenous Nigerian licensees may improve local R & D potential.

Moreover, the NOIP has, since its inception, generally rejected export prohibition clauses except in cases where it has been proved

that other licensees of the licensor have been granted exclusive licences in the specified countries closed to Nigeria licensees. While this seems to be similar to the Philippines Technology Transfer Board's approach it differs from the Nigerian to the extent that prohibition to export to certain countries, especially where there exist exclusive licensees of the technology supplier, may only be permitted to the extent that the laws of the country where exportation will be made prohibit such exports (Bautista, 1980).

Export restrictions, apart from the requirement to submit to foreign jurisdiction, occur more frequently in technology licensing agreements involving Nigerian firms than any other restrictive practices (see table 7:7) and this makes their rejection by the NOIP very significant. Their elimination may enable Nigerian enterprises to export to the international market. It must, nevertheless, be noted, as pointed out already, that the exclusion of export restrictions per se may not automatically result in actual export or export potential of Nigerian licensee firms. This can, in fact, be impeded by other factors. For example, in Nigeria there are a number of restraints such as the shortage of import licence required to import inputs and other intermediate requirements for manufacturing and the consequent low productivity which are seriously affecting the export activities of indigenous enterprises.

As one top official of a manufacturing firm in Lagos remarked:

> Export restrictions do not mean much to us because as a result of the present austerity measures, and even some years back before their institution, my company never got and still does not get the approval for the required import licence to bring in the actual volume

> of inputs needed for our operations. Consequently, our production is always under capacity and so we find it difficult to satisfy the home markets which makes us hardly bother about exports.[5]

All this as well as the unduly elaborate and slow bureaucratic procedures required of firms wanting to export, the inadequate supply capabilities of indigenous enterprises, and, equally important, the high production cost of domestic products may render the export restriction clause to be of little consequence to most Nigerian firms.

Nevertheless, the exclusion of export prohibitions may constitute a significant step towards the development of export capabilities of Nigerian licensee firms. In fact, it sets the stage for the meaningful encouragement by the government of manufacturing firms to export.

The Nigerian government has, in addition to the exclusion of export restrictions in technology transfer transactions, adopted, in its industrial policy and strategy, a number of steps geared towards encouraging firms wanting to export. (See Fed. Rep. of Nigeria, 1980). These include the reimbursement to an entrepreneur of the whole amount of import duty paid on imported materials which are used in the manufacture of goods which are exported. This is the "duty drawback scheme". By this scheme a refund of import duties as well as other locally levied taxes such as excise duty on the raw materials used in the manufacture of a product that is destined for export are made (Ibid.). One possible merit of this policy is the likely reduction in production cost of products destined for export.

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5. Interview with a Nigerian industrialist, Lagos, December 1984.

Further fiscal incentives adopted to promote exports are the "bank finance for export" which is to ensure that a minimum level of bank credit is made available to the export sub-sector and thereby to facilitate short-term financing for pre-shipment and post-shipment export operations, and the "approved users' scheme" which is aimed at stimulating industrial production within Nigeria through relief from import duties and the institution of necessary tariff protection. Another fiscal incentive is the "tax incentive for manufacturing exporters" the objectives of which are to enable companies to amortise expenditure on their assets within the shortest possible period, to make them more competitive in international markets, to expand their productive capabilities, and to earn more foreign exchange for the country (Fed. Rep. of Nigeria, 1979).

Moreover, the Nigerian government in its determination to stimulate exports by local firms has set up an Export Development Fund to provide direct grants and financial assistance to the country's exporters to cover initial expenses regarding their export promotion activities (Ibid.). Similarly, an export credit guarantee fund and insurance scheme have been set up to provide financial guarantees to commercial banks for insurance cover for exports from Nigeria (Ibid.).

Finally, the government has adopted the creation of "industrial free zones" in various localities in the country to encourage certain industries to orient their production towards the export market. Industries in such zones will enjoy special privileges and produce exclusively for export. The location of these zones, which will be equipped with the necessary infrastructural facilities, will be determined mainly by the raw material input available in each locality (Fed. Rep. of Nigeria, 1980). As part of the industrial free zone concept, the Export Promotion Council set up by Decree No. 26 of 1976

to oversee the country's export programmes and activities is to co-operate with industries operating in these zones to facilitate the sale of their products in non-Nigerian markets (Ibid.).

Clearly, all these are very significant developments being pursued by the government to encourage exports by Nigerian firms. As to the efficacy of these measures it may appear too early for one to venture an opinion since they are all still in their embryonic stage. Nevertheless, it may be asserted that with the prohibition and exclusion of export restrictions from technology agreements these measures when effectively and judiciously executed coupled with the adoption of other related appropriate measures such as the adoption of a stable and realistic exchange rate, instead of an overvalued currency which could penalise the development of exports, could enhance the export potential of and actual export by Nigerian firms.[6]

The NOIP, like the Filipino T.T.B.. has also in particular refused to accept exclusive grant-back or improvement clauses. It, however, entertains mutual grant-back whereby there is a reciprocal exchange of improvements between the foreign licensor and the Nigerian licensee. It has, in addition, rejected any restrictions which continue in force after the determination of the agreement. Furthermore, it has refused to accept tied-purchase covenants, but has so far accepted those which provide for the supply of new materials by transferors of technology considered necessary and which explicitly state that the prices for the tied goods will be at normal world market prices. Table 7:7 indicates the frequency of some of these prohibitive covenants. As the table reveals clauses requiring the submission to foreign jurisdiction are the most frequent. These are

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6. For further discussion on this and the export incentives see Sagagi (1985).

Table 7:7

Nature and frequency of restrictive clauses in agreements examined by the NOIP (January 1983 to May 1984)

Types of Restriction	No. of Agreements containing restrictive clauses	% of total
Excessive controls of transferee's operation	16	7
Non-reciprocal transmission of improvements, patents, etc.	9	4
Tie-in clauses	21	9
Export restrictions	72	31
Restriction on production volume	16	7
Foreign jurisdiction	97	42
Limitations on R & D	5	2
Price restrictions	5	2

SOURCE: UNCTAD, 1984a, p.3

Note: The same agreement may contain more than one restrictive clause.

followed by export restrictions. The NOIP has similarly refused the inclusion of the former in licensing agreements to which Nigerian licensees are parties. In addition, it ensures that Nigerian law is applicable in all agreements and that related arbitration takes place in Nigeria.

Other unacceptable practices which the NOIP has had to deal with since its establishment include the excessive duration of technology transfer agreements (see table 7:8). It has accordingly ensured an appropriate reduction in duration of agreements exceeding a period of 10 years, or other unacceptable term where this is less than 10 years.

A number of other LDCs also oppose agreements with an unduly long duration. Most of them including Colombia and the Philippines normally allow a maximum of five years. This five-year rule is subject, in some cases, to exemptions. For example, in the Philippines exemptions have been given to agreements exceeding the five year period which involve new technology, a royalty free licence on trademark use, and a longer absorption period for the technology being transferred (Bautista, 1980, 17). However, in others such as India and Mexico agreements may last for a maximum of 10 years (UNCTAD, 1980b, paras 105-106). It is pertinent to note that such agreements may not necessarily be terminated at the expiration of the reduced term. The reduction may, in reality, be aimed at ensuring a re-evaluation of the agreement by the competent bodies within a reasonable time, in order to ascertain whether they are being executed in consonance with the terms as approved by them (UNCTAD, 1980b, para. 108).

Table 7:8

Nature and frequency of other contractual terms subject to legal control (January 1983 to May 1984)

Contractual term	No. of agreements containing contractual terms	% of total
Excessive payments	209	90
No provision for training of transferee's personnel	88	38
Excessively long duration (10 yrs and above)	97	42
No provision for specified guarantees	114	49
Transferee obliged to pay transferor's taxes	56	24

SOURCE: UNCTAD, 1984a, p.4

In its reaction to other practices contained in table 7:8 the NOIP examines every agreement to confirm that it embodies adequate training provisions. This is very important if the necessary skills associated with the imported technology are to be transferred to the indigenous labour force. Moreover, it ensures that all registrable industrial property rights that are licensed are registered in Nigeria and that the licensor guarantees and enforces the validity of industrial property rights.

One area where the NOIP has, in its regulation of the inflow of imported technology, been quite successful is that pertaining to the payment of royalties and technical fees. The frequency of the practice whereby foreign licensors require from Nigerian licensees incommensurate consideration as revealed by table 7:8 is very great. This practice if left unchecked could adversely affect the country's balance of payment position. It is in this respect that one does appreciate the efforts of the NOIP.

The NOIP has endeavoured to reduce the number of technology transfer contracts which prescribe payments which are incommensurate with the technology to be acquired and has in fact succeeded in reducing such payments. The efforts of the National Office, as demonstrated by table 7:9 has in the period between January 1983 and May 1984, resulted in savings of a little over N33[7] million in foreign exchange in respect of 62 agreements approved during that period. These savings have been accomplished, inter alia, by the diminution of royalty rates to about one per cent of net sales, and one and half per cent of profit before tax with regards to technical and management agreements as opposed to three per cent of net sales or

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7. N represents Naira, the Nigerian currency. The exchange rate before 1986 was about N0.8469 to $1.0

turnover before the intervention of the NOIP. In addition, the savings can be attributed, on the one hand, to the encouragement by the NOIP of running royalty payments as against down and lump sum payments, and, on the other, to the discouragement of minimum royalty payments.

Similar savings have been recorded in other LDCs including India, Argentina, Brazil, Mexico and the Philippines. The rates of royalty payments allowed by these countries normally range between one and five per cent. The enforcement of this rate of royalty payments has resulted in important savings in some of these countries. For example, with respect to Mexico it has been estimated that between 1973 and August 1975 a saving of $216 million, equivalent to 26 per cent of the value of payments that would have been made without government intervention was obtained (UNCTAD op. cit. para 52). Similarly, in the Philippines, the estimated foreign exchange savings for five years as a result of the T.T.B. reduction of royalty rates in 48 out of 80 contracts approved will amount to $40 million (Bautista, 1980, 20).

Table 7:9 illustrates the sectoral breakdown of agreements submitted to and ratified by the NOIP as well as the sectoral savings it made. On the whole a total of N33,041,645 in foreign exchange saving was achieved by the NOIP. Since one of the underpinning rationales for government intervention in the technology market is the reduction to a more acceptable level of the large payments of royalties and technical fees imposed on licensees, these savings can be said to be a significant achievement.

Table 7:9

Agreements submitted to the NOIP for approval

(January 1983 - May 1984)

Industrial Sector	Agreements Submitted	Agreements Approved	Agreements Involving Payment above 5m Naira	Agreements Involving Payment under 5m Naira	Total Savings
Agro-based	75	21	36	37	27,797,970
Mineral-based	48	15	28	20	2,332,300
Engineering	89	20	42	47	2,811,375
Services	21	6	17	4	100,000
Total	231	62	123	108	33,041,645

SOURCE: UNCTAD, 1984a, p.2

However, for this to be fully appreciated there may be the need to examine this saving in connection with the explicit payments (i.e. royalties) together with the number of implicit costs (e.g. overpricing of inputs provided by licensors) which could drastically reduce such savings. In this respect it is significant that the NOIP examines the extent to which parties have employed other means such as overpricing of inputs to circumvent government regulations.

The possibilities of employing such channels are, as observed by Chudnovsky (1981, 138), to some extent, determined by the clauses of the licence agreement. For example, where the contract does not provide for any tied-purchases it will be difficult to overprice inputs required by licensees to exploit the licensed technology. On the other hand, where a clause is embodied in the contract by which the licensee is obliged to purchase the necessary inputs from a

source determined by the technology supplier then it may not be difficult for such inputs to be overpriced. Consequently, the measures adopted in respect of royalties need to be assessed jointly with the entire regulations on prohibitive practices in technology transfer contracts. It will, therefore, be necessary to assess the gamut of the NOIP activities or success in regulating technology transfer transactions if the full significance of the savings achieved is to be appreciated.

The full impact of the savings and the entire NOIP technology regulatory activities may appear difficult to assess since most of the approved agreements are yet to be executed or even if executed they must be in their embryonic stage. Until the execution of the approved agreements it will be difficult to assess the current achievements of the NOIP. This appears to be so because, though evidence is not available in respect of Nigeria, the experience of other LDCs including Brazil and India has revealed that after scrutiny of agreements and the compliance with suggested amendments technology suppliers and recipients have subsequently by passed approved terms and conditions by other means like "gentlemen's agreements". (See Chudnovsky, 1981, ppl44-147). In other cases, licensee firms have opposed government imposed terms and conditions and have tacitly accepted some outlawed prohibitive practices (Ibid.), thus circumventing government regulations.

The possible occurence of all these practices in Nigeria can not be completely ruled out and the NOIP may therefore have to develop an effective monitoring system, which is presently absent, to ensure that ratified terms and conditions of technology contracts are complied with. In fact, the extent to which the NOIP expects parties to comply

with its regulations or directives would not only depend on its position on the subject, but also on the entire institutional framework within which transfer of technology agreements are monitored. It is for this reason that the development of an effective and comprehensive monitoring system cannot be ignored any longer. Nigeria could possibly, in this respect, seek assistance from UN bodies such as UNCTAD and UNIDO, or the African Regional Centre for Technology (ARCT) based in Senegal and whose major function is to assist its member African countries in matters relating to the transfer and development of technology. Just like Nigeria, a number of LDCs, but excluding India, either have a very weak monitoring system or none at all, and this clearly is a major weakness in the LDCs' technology regulatory regime.

Furthermore, the extent to which one may expect parties to comply with the directives of the NOIP may, as suggested by Chudnovsky (1981, 143-147), depend on the congruence of the overall interests of the government and those of the licensee firms. Where the private interests of licensee firms differ from government objectives their backing for government intervention may not be encouraging. This may, particularly, be so where domestic enterprises are able to pass on high technology costs to customers. In this case they may not be very keen on reducing the costs of technology imports, especially if that is likely to affect in any way their technology supplies. In fact, they may not hesitate to make further payments in addition to the approved royalty. All this may not render the formal foreign exchange savings and others as an adequate measure of the achievements of the NOIP. Nevertheless, its intervention has been significant, particularly, in respect of the reduction of direct payments and the elimination of prohibitive covenants.

It may be pointed out here that the initial reaction of both Nigerian firms and foreign technology suppliers to the implementation of Decree No. 70 of 1979 was very unfavourable. The former perceived it as an additional administrative hurdle which was likely to prejudice the influx of technology and, thus, affect their manufacturing activities. On the other hand, the latter saw the Decree and the activities of the NOIP as a further impediment which could adversely affect their operations, and endeavoured to resist them. In some instances, especially in the case of existing agreements, some MNCs threatened to withdraw their technical assistance after current royalty rates had been reduced. This increased government pressure on the NOIP's operation.

However, as one NOIP senior official pointed out, the initial hostile attitude of domestic firms has now given way to a growing appreciation of the Decree and the functions of the NOIP, and a number of these firms now seek informal assistance from the latter in the course of the negotiation of agreements. This according to the National Office has significantly helped to improve the quality of new agreements submitted for registration. As regards foreign technology suppliers, the same official observed that a number of them have also come, though quite reluctantly, to accept the need to regulate the transfer of technology transactions. This is not surprising since most of them have been experiencing either similar or even tougher regulation at home. Consequently, as stated by the same official "the effect, generally, of the regulatory activities of the National Office on the flow of technology into the country has not been negative".[8]

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8. Interview with a Senior Official at the NOIP, Lagos, December 1984.

Conclusion

In spite of the fact that the 1970 Patent Decree appears to have contributed to increased participation by Nigerian inventors in patenting activity in Nigeria this activity still seems to be dominated by foreign inventors. It may be added, as has been revealed, that a considerable number of the domestic inventions are not of any great industrial and economic consequence, and only the introduction of an examination relating to substance, which could be selective or otherwise, might give some idea about the actual value of the increased participation by indigenous inventors.

It may also be mentioned that so far as the effective transfer of technology is concerned the Nigerian patent law and system have not been very successful. It is, therefore, imperative for that country to appraise the efficacy of its present law and system's contribution to the transfer into and development of technology in the country, and how they can be altered so as to fit harmoniously into current efforts to develop a technology policy for the country. In this respect, Nigeria may need to restructure its patent administration, and particularly the Patent Office so that instead of its continuing passive enforcement of the Patent Decree and role of a mere registration centre, it could play more active role in the dissemination of new technical information. Moreover, there is the need to evaluate how the provisions relating to patentability, patent duration and fees and abuse checking measures can all be utilized as tools for economic development.

As revealed in Chapter 6, the discrimination by the provisions of patentability under the Nigerian law is not grounded on any

economic policy. It may, therefore, be necessary, as suggested in the case of Ghana, for Nigeria to relate this discrimination to its technological and economic developmental needs. In this way, the patent system can be used to exclude from patentability foreign technologies which may either be economically irrelevant to the country or have the potential of blocking the development of I.T.C. It could also be used to ensure the registration of such technologies which will constitute a generative and not a consumptive technology transfer. All this will, of course, ordain the adoption of an examination system which assesses the substance of patent applications. Similarly, the duration of patents as well as patent fees need not be uniform for all inventions as they presently are in Nigeria. They must, instead, be related to either the merits of the inventions, the sector to which they relate or the actual exploitation of the patent. Finally, there is also the need for all the patent abuse checking mechanisms to be used to prevent patent abuses and to ensure the effective exploitation of registered patents. This may encompass the simplification of procedures involved in obtaining for example, a compulsory licence.

Despite the fact that the Nigerian patent system has not been very successful in transferring technology to the country, it has, inter alia, been used by foreign licensors to indulge in anticompetitive practices as demonstrated above. The NOIP, as we endeavoured to demonstrate, has to some extent, succeeded in excluding such practices from technology transfer transactions involving Nigerian enterprises. It has, in fact, refused the approval and registration of agreements which embody such restrictions, but has, on some occasions on economic grounds, accepted some agreements with such restrictions. Another success recorded by the NOIP is the saving of

N33,041,645 in foreign exchange made within a period of about 17 months. While all this can be regarded as a significant achievement it is still difficult to appreciate its full and real impact since there is often the tendency for both licensors and licensees to circumvent government regulations, especially where they are likely to hurt their business interest.

It is for this reason that every regulatory regime needs an effective back-up monitoring system. In Nigeria, however, an efficacious monitoring system seems to be absent, and this represents a serious shortcoming in the country's technology transfer regulatory regime. With this shortcoming, it is difficult to confirm whether both licensors and licensees have adhered to and not circumvented the NOIP approved criteria, and whether, by virtue of their actions, the savings recorded by the latter has been affected or not.

CHAPTER 8

COMPARATIVE ANALYSIS AND RECOMMENDATIONS

Introduction

The last five chapters, which represent the two case studies undertaken in this thesis, have examined in a rather detailed form the patent laws and systems as well as the technology transfer regimes in Ghana and Nigeria which are distinct and yet similar in many respects. In this chapter, we shall undertake a comparative analysis of the main issues raised and discussed in the two case studies. We shall, in this respect, compare and contrast the two case studies in terms of the historical development of the patent systems of the two countries, their present patent laws and systems and their technology transfer regulatory regimes. The chapter will be concluded by offering recommendations based on our findings.

Comparative Analysis

Historical Development of the Patent Systems of Ghana and Nigeria

As already indicated in Chapter 3, Ghana and Nigeria, both of which used to be colonies of Britain, operated, with the exception of the differences that took place between 1916 and 1925, similar patent legislations and systems from 1900 to 1970 when Nigeria after ten years of independence from British colonial rule enacted for the first time its own autonomous patent legislation. The development of the patent systems in both countries can be traced to the discovery of large gold deposits in Ghana (then Gold Coast). It was the need to

encourage the influx of the relevant foreign technology, particularly patented technology, for the exploitation of this resource which underpinned the introduction of the patent system in the Gold Coast via the enactment of the 1899 Patent Ordinance. Though no specific reason was given in the case of Nigerian the 1899 Gold Coast Patent Ordinance was adopted almost in its entirety in 1900 in the then Lagos Colony and Southern and Northern Protectorates which together now form Nigeria.

Thus between 1900 and 1916 the patent laws and systems of the two countries were very similar. This similarity between the patent laws and systems of Ghana (then Gold Coast) and Nigeria was temporarily interrupted in 1916 when the colonial government promulgated for Nigeria the 1916 UK Patents Registration Ordinance. This ordinance which was necessitated by the dearth of technical personnel required to operate the patent system established by the preceding ordinance (supra), destroyed the then somewhat independent patent system. Instead, it linked the Nigerian patent system to the U.K.'s and made the procurement of Nigerian patents dependent on prior U.K. grants. This means that the similarity that existed between the patent systems of Ghana and Nigeria when they were first introduced in the two countries ceased to be so from 1916 onwards. From that year Nigeria began to operate a dependent system while the Gold Coast continued to operate its independent system until 1925.

The year 1925 restored the similarity that existed before 1916 between the patent laws and systems of Ghana and Nigeria with the promulgation of the 1925 U.K. Patents Registration Ordinance first in Ghana (then Gold Coast) and later in Nigeria . For Ghana, on the one hand, it was a major departure from the then existing patent regime because this ordinance, like the 1916 Nigerian ordinance, destroyed

the independent patent system then in vogue in the country, and instead made it dependent on the U.K. for the procurement of patent monopoly grants. For Nigeria, on the other hand, the 1925 Ordinance was essentially a reiteration of that of 1916 and therefore of no major effect. In 1970 Nigeria promulgated its own autonomous patent law, Decree no. 60 of 1970, which once again introduced dissimilarity between its patent law and system and those of Ghana.

Present Patent Laws and Systems of Ghana and Nigeria

As revealed in Chapters 4 and 6 there is currently a significant difference between the Ghanaian and Nigerian patent laws and systems which was brought about by the enactment of Nigeria's Decree No. 60 of 1970. This decree, as noted in Chapter 6 provides for a comprehensive patent law and creates an independent patent system for the country, and has made it possible, for the second time in the patent history of the country, for both domestic and foreign inventors to obtain monopoly grants directly in the country without any recourse to the U.K. Patent Office.

On the contrary, Ghana still operates under the 1925 Ordinance and is consequently dependent not only on the U.K. Patent Office for the examination of patent applications before it can issue monopoly grants but also dependent on some aspects of the U.K. patent legislation particularly on issues such as patentability of inventions, terms and duration of grants. It may, however, be observed that as a result of the exclusion from patentability of pharmaceutical products by NRCD 81 such products are not covered by the provisions of patentability under U.K. legislation.

Another dissimilarity which seems to be derived partly from the above divergence between the patent laws of Ghana and Nigeria is the difference between the volume of patents filed in both countries. The total number of patents registered in the latter, for example, within a period of six years, that is between 1978 and 1983 added up to 3,000 while the entire volume of patent grants filed in the former within the same six year period amounted to only 145 which represents about 4.83 per cent of those filed in the latter country. A number of factors may appear to be responsible for this wide difference. First, the independent patent system of Nigeria, particularly its registration system of examination makes it much easier and possible for all patent applications to be granted monopoly privileges automatically once they satisfy the statutory requirements. On the other hand, the preliminary examination system as well as the inherent tedium and expense involved under the Ghanaian patent system makes the procurement of patent grants in Ghana a very onerous task. Another factor which may explain this difference is the exclusion of pharmaceutical products, which are still registered in Nigeria, from patentability under the Ghanaian law. Finally, the attractiveness of the large size of the Nigerian market may also explain the registration of more inventions there than in Ghana.

In spite of the above difference there seem to be some similarities in respect of the technological context within which the patent laws of the two countries were introduced and the practices associated with their patent systems. As already observed, the present patent system of Ghana is founded on a colonial ordinance promulgated in 1925 when Ghana was then a colony and could not have possibly developed its own authentic technology policy. On the other hand, the patent system of Nigeria is based on Decree No. 60

promulgated in 1970, that is ten years after that country's independence, but during which period it, similarly, had no comprehensive technology policy. All this indicates that the patent laws and systems of both countries were developed not within the context of any technology policy, and thus not as an integral part of an overall national technology planning.

In addition, it may be noted that because Ghana does not at present have any coherent technology policy and Nigeria, which is presently working on one does not have one yet, both countries have not made efforts to alter, in any significant manner, their patent laws so as to reflect some of their identified technological needs. The implication of this is that in addition to the fact that the patent laws of both countries were introduced in a technological vacuum no efforts have since their introduction been made to incorporate them into an overall national technology programme and to render them more relevant to the economic priorities of both countries.

It is therefore, not surprising, as revealed in Chapters 4, 5, 6 and 7, that the patent laws and systems of both Ghana and Nigeria have not been effectively employed as tools of economic and technological policies. It was observed in the said chapters that despite their potential to be used as such the provisions on patentability, patent fees and duration have not been utilized by the two countries as deliberate policy to either encourage the inflow of relevant and generative foreign technology or to discourage the transfer of certain technologies which may harm the development of I.T.C.

Another point of similarity between the patent system of Ghana and Nigeria which is shown by the discussion in Chapters 5 and 7 relates to the administration of patents in the two countries. It

became quite clear in the said chapters that the patent offices in both countries have not, generally, been effective in the administration of patents. Instead, they have merely served as patent registration centres and do not undertake any other functions expected of patent offices. To be specific the two offices do not adequately publish new inventions in any patent journal or publication, and thus do not help to disclose new technical knowledge to the general public. In addition, as a result of very poor filing systems, general indifference and lack of adequate resources and governmental support the two patent offices have also not been successful as databanks for technical information. On the whole, both offices have not contributed adequately to the technological and industrial development process in their respective countries.

A further area of similarity between the patent systems of Ghana and Nigeria is that of patenting activity. As revealed in Chapters 5 and 7 the majority of inventions registered in the two countries are of foreign origin. The countries which dominate this activity in both countries are mainly the countries of Western Europe, and they include the U.S., U.K., Switzerland and West Germany. The two case studies showed that these countries normally take the lion's share of all inventions registered in both Ghana and Nigeria. Another similarity in this respect is the small number of other African countries participating in this activity in the two countries. During the period between 1977 and 1983 all the African countries which filed inventions in Ghana, that is, the Ivory Coast, Nigeria and South Africa, accounted for only 1.8 per cent of all inventions registered there. Similarly, between 1978 and 1984 the African countries, which filed inventions in Nigeria, that is, the Ivory Coast, Zimbabwe and South Africa, accounted for only 0.23 per cent of all patents registered there.

This clearly demonstrates that there is not much participation by African countries in the patenting activity of one another; this could partly be explained by the paucity of R & D scientists and engineers as well as the inadequacy of R & D infrastructure and resources.

A further examination of the proportion of inventions registered in Ghana and Nigeria during the period under consideration in the context of West African sub-regional co-operation reveals a very depressing picture. Table 5:5 shows the Ivory Coast and Nigeria as the only West African countries which filed inventions in Ghana during that period while table 7:5 reveals that the Ivory Coast is the only West African country which filed an invention in Nigeria during the period under consideration. This has significant implications for Ghana and Nigeria and the ECOWAS[1] of which the two countries are members. First, it illustrates the low level of new technical developments within the ECOWAS sub-region. Secondly, and more importantly, it also demonstrates that the dissemination of new technical knowledge amongst the ECOWAS members is still not very popular despite the Community's avowed objectives of increased inter co-operation in technical, trade and other activities. It may, therefore, be necessary for the Community to establish, among other measures, a common legal regime which may be able to encourage increased spread of technical knowledge within it.

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1. The ECOWAS (Economic Community of West African States) is a regional economic grouping which comprises all the West African countries.

An additional similarity which directly follows from the above relates to the almost complete absence of participation by Ghana and Nigeria in each other's patenting activity. As table 7:6 reveals there was not a single Ghanaian invention which was filed in Nigeria even after the promulgation of the 1970 Decree which makes the filing of inventions in the latter very easy. As observed in Chapters 4 and 5 some Ghanaian inventors, because of the existing procedure in their country, abandoned their efforts to obtain Ghanaian patents. Though these inventors could have obtained Nigerian patents for their inventions, they have, however, till now made no attempts in that respect. It may also be added that the only Ghanaian invention - the mashing machine - so far registered in both the U.K. and Ghana has no record of its registration in Nigeria despite its economic usefulness for that country. The non-participation by Ghanaian inventors in Nigeria's patenting activity reflects the low level of technical co-operation between the two countries, and may be partly due to the lack of awareness on the part of such inventors of the benefits of securing patent rights in as many countries as possible.

Similarly, the participation in the patenting activity of Ghana by Nigerian inventors is, though not totally absent, minimal. It is on record that out of a total of 86 Nigerian inventions registered in Nigeria between 1978 and 1984 only two have so far been registered in Ghana; these are the device for planting stem cuttings and the portable planter (supra). The success in obtaining Ghanaian patents for these inventions may, in addition to their patentability, be attributable to the institutional support they received from the University of Ife in meeting the cost involved in first obtaining the U.K. patent and subsequently the Ghanaian. The non-filing of the remaining Nigerian inventions in Ghana may, it may be conjectured, be

ascribed, in addition to the unawareness of benefits accruing from the filing of inventions in many countries, to either their doubtful patentability or the inabilities of the inventors to wade through the expense and tedium involved in procuring a Ghanaian patent.

Another striking similarity in the area of patenting activity is the level of participation by domestic inventors in this activity in their respective countries. In the case of Ghana, official records indicate that the share of Ghanaian inventors, excluding the mashing machine which the author discovered was developed by a Ghanaian and registered in Ghana in 1975, of all patents registered in the country is nil. With respect to Nigeria all inventions registered by Nigerian inventors constitute a minute proportion of total inventions registered in the country. However, when the number of registered Nigerian domestic inventions are compared with the Ghanaian a clear difference emerges. For example, while Nigerian inventors registered 2.53 per cent of all inventions filed in the country between 1978 and 1984 there was not a single Ghanaian invention registered in Ghana during almost the same period.

The final similarity between the Nigerian and Ghanaian patent system is in respect of the system's contribution to the transfer of technology to both countries. The majority of patents registered in the two countries are usually not worked domestically. They have instead been exploited by patentees through the importation of the relevant patented products or products derived from patented processes. The system has not significantly influenced the transfer of technology through the other conduits such as FDI and joint ventures in both countries. In addition, patent licensing as a vehicle for transferring technology, as already observed, is not very

popular in either country. In most cases they are combined with other transactions such as know-how licensing and technical services and management agreements. In effect, the patent system per se has not been very effective in transferring technology to both countries.

Technology Transfer Regulatory Regimes in Both Countries

The other area where the study reveals sharp similarities and dissimilarities pertains to the regulatory mechanisms set up by the two countries to control the transfer of technology, particularly the inclusion of restrictive practices in technology transfer agreements involving licensees of both countries.

Though, as already observed, the patent systems of Ghana and Nigeria have not been very effective in transferring technology to both countries they have, nevertheless, been employed by patentees to impose on licensees in the two countries certain anticompetitive practices which have been discussed in the preceding chapters. Even though the data in Chapters 5 and 7 as regards these practices in both countries may be restricted in terms of the period they cover they help to demonstrate the extent of their occurrence.

A comparative study of the occurrence of restrictive clauses in Ghana and Nigeria reveals some degree of both similarity and dissimilarity. The study exhibits foreign jurisdiction as the most frequent of these clauses in both countries, followed by export restrictions. While the latter is followed in Ghana by excessive controls of transferee's operation (supra), they are, with respect to Nigeria, followed by tie-in clauses. The least frequent of these restrictive practices in Ghana include grant-backs and restriction on

adaptation, while in the case of Nigeria they are price restrictions and limitations on R & D.

While the occurence of these practices seem to indicate that they are of the same magnitude in both countries, a further examination reveals, however, that they are somehow more on the high side in Ghana than they are in Nigeria. For example, while 47.5 per cent of technology transfer agreements studied which involve Ghanaian licensees embodied clauses relating to foreign jurisdiction the percentage recorded for such agreements involving Nigerian licensees which embodied the said clause was 42. Moreover, while 32.5 per cent of licensing agreements involving Ghanaian licensee enterprises included export restrictions that of Nigeria amounted to 31 per cent. Though differences do exist here they are so minimal that it may be right to assert that the magnitude of the occurrence of anticompetitive practices in both countries is similar.

Nevertheless, an examination of the technology transfer regimes of both countries exhibits, though some degree of closeness exists, very sharp differences. The first dissimilarity between the two regimes pertains to the general approach adopted by the two countries to regulate technology transfer transactions vis-a-vis foreign investments. As was observed in Chapter 4, the regulation of transfer of technology transactions in Ghana is carried out as an integral aspect of the control of foreign investments in the country. Accordingly, the regulation of technology transfer and FDIs in general is not only integrated but also supposed to be governed by one enactment and administered by a single authority. The effective integration of the controls of both transactions may make possible a very efficient co-ordination of all the related activities.

However, in Nigeria, unlike Ghana, the regulation of transfer of technology agreements and FDIs are not integrated and are, instead, undertaken as distinct activities. Consequently, there is, on the one hand, a different enactment (the NOIP Decree) and body (the NOIP) which governs and administers respectively technology transfer transactions, and, on the other, a number of enactments and programmes and institutions which control and oversee foreign investments in the country (supra). This clearly represents a divergence in the regulatory approach adopted by the two countries.

Another glaring disparity that exists between Ghana and Nigeria in respect of technology transfer transactions lies in the institutional and administrative machineries set up for that purpose. Though the 1985 Investment Code of Ghana, PNDCL 116, like its predecessor Act 437, entrusts the GIC with the regulation and approval of transfer of technology as well as other related functions they are in practice shared by a variety of competing institutions. The performance of these functions is undertaken by, besides the GIC, the Ministry of Finance and Economic Planning (MFEP) and MIST whose functions and powers have a bearing thereon, GIHOC which examines its own investment agreements including transfer of technology, the TTC , and the PAB whose regulatory functions have so far been mainly centred on foreign currency payment aspect and the country's balance of payment position.

This proliferation of institutions performing the same technology transfer regulatory functions has led to rivalry between the institutions involved which makes the co-ordination of their activities very difficult. This was clearly brought out by complaints made by almost all the senior officials of the relevant bodies the

author spoke to. Almost all of them complained that each body was "creating an empire for itself" which made co-ordination between them almost impossible. This situation seems to be exacerbated by the fact that all the relevant bodies are independent of each and are only remotely responsible to their respective supervising ministries. So that none of them can, without the necessary co-operation of the other, compel the other or others to follow any particular line of action or perform a given function. A classic example which illustrates this situation and readily comes to mind is the case in which the head of one of these bodies (the TTC) requested certain documents and copies of approved contracts from the Secretary to another body (PAB). On receipt of this request the said secretary asked the requesting head to forward his request to the Attorney General, the supervising head, who on receipt thereof also asked the requesting head to put in writing and in detail the reasons for wanting those documents. Several months of waiting did not furnish the requesting head with the documents he needed. A further demerit of the duplication of technology regulatory functions by these state institutions is that it involves unnecessary wastage of both financial and manpower resources which are not abundant.

On the contrary, the administration and regulation of technology transfer transactions in Nigeria is entrusted to and performed by one body. In that country, apart from bodies such as the Federal Ministry of Finance (FMF) and Federal Ministry of Education, Science and Technology (FMEST) which exercise certain functions and powers having a bearing on the transfer of technology, the NOIP is the main administrative body vested with the regulation of all inflows of technology into the country. In fact, unlike the prevailing situation in Ghana, it is only the NOIP which evaluates, approves, registers and

issues a certificate of registration for all technology transfer agreements. Similarly, it is the body which is responsible for the efficient identification and selection of foreign technology, the development of the negotiating skills of Nigerians and adaptation of imported technology. Finally, it is the body responsible, though the Central Bank of Nigeria still vies with it in this respect, for evaluating and the setting of appropriate royalties or licence fees for licensors. The centralisation of the functions of regulating and approving of technology agreements in the NOIP makes it possible for it to undertake its assignments without suffering from the shortcomings which obtain in Ghana.

A further point of dissimilarity which needs to be brought out relates to the fate of technology transfer agreements which embody any of the restrictive clauses out-lawed by the relevant laws of the two countries. The position under the Ghanaian law, as already observed, is that any such agreements are null and void and cannot, therefore, be invoked in or enforced by any court of law. In addition, they cannot serve as a basis for the payment of any foreign currency to the favour of any party thereto. In contradistinction, any such agreements under Nigerian law may not necessarily be null and void and could therefore be enforced by any court of law in the country. The only sanction attached to these agreements by law is that they will not qualify for transfers of foreign currency to be made to the favour of any parties thereto, and accordingly any payments due thereunder will be disallowed.

The final point of difference between the regulations of technology transfer in Ghana and Nigeria is the level of development of their regulatory regimes. The previous chapters have made it clear that the regulatory machinery in Nigeria seems to be more developed

than in Ghana. In the former, comprehensive criteria have been established to guide the NOIP in the execution of its functions. These criteria have clearly laid down the types of restrictive practices which disqualify agreements from registration and the general requirements they must satisfy. On the basis of these criteria the NOIP has rejected a number of agreements which would otherwise have been put into effect. Similarly, the NOIP, on the basis of the criteria and the royalty rate established by it have saved for the country about N33 million. Despite the absence of an efficient monitoring system to enable the assessment of the actual impact of the NOIP's operations and the real value of the above saving it could be said that the Nigeria regulatory system has at least been put into motion and recorded some success.

However, the regulatory regime in Ghana is yet to be given an actual breath of life. Though the Investments Code of 1981 called for the adoption of regulations to guide the GIC in controlling technology transfer transactions there have not, up to the present moment, been in existence any such regulations. It is hoped that the fresh provision in PNDCL 116 for the adoption of such regulations by the GIC will bring them into existence. The absence of these regulations and the ongoing rivalry between the GIC and other government institutions have seriously affected the regulatory functions of the GIC. Clearly, the technology transfer regulatory regime in Ghana is still in a rudimentary stage.

In spite of these disparities between the technology transfer regimes of Ghana and Nigeria there do exist, in the same respect some degree of similarity. The first major similarity between the technology regulatory regimes of the two countries is the total absence from these regimes of a well developed and efficient

monitoring system which is needed to ensure compliance by both licensors and licensees with approved terms and conditions, as well as to stop or minimise circumvention of government regulations. The absence of such a monitoring system represents a fundamental deficiency in the technology regulatory regimes, and until its effective establishment by the latter it may render the true assessment of the success or failure of the regimes difficult to make.

A further similarity is that both countries, irrespective of the inadequacies of their regulatory regimes, have at least come to realise the need to regulate the inflow of foreign technologies to their respective countries. The significance of this is that by coming to terms with this and, thus, preparing the ground to control foreign technology they are both making some endeavours to ensure the efficacious transfer of technology which could contribute to the development of the I.T.C. of both countries.

The final point of similarity relates to the additional measures adopted by the governments of both countries, besides the prohibition of restrictive clauses by the relevant enactments, to encourage more local R & D as well as to promote increased exports by domestic manufacturing enterprises. It will be recalled from Chapters 4, 5, 6 and 7 that in addition to the possible regulation of restrictive business practices (See S.30 of PNDCL 116) which encompasses restrictions on R & D and export in the case of Ghana, and the exclusion by the NOIP Decree of the above mentioned restrictions the two countries have established and provided for certain incentives to spur on more indigenous R & D and to increase the export potential and actual exports by their domestic manufacturing firms. These incentives or measures when effectively applied could enhance the capabilities of such enterprises in these areas.

It does appear from the above that while there are some similarities between the patent systems and technology transfer regulatory regimes of both countries there exist, at the same time, very fundamental differences. Consequently, it will seem that even though similar endeavours or recommendations could be made towards their improvements, appropriate solutions will not always be identical in the two instances.

Recommendations

Our discussions in the preceding chapters have revealed a number of difficulties in respect of the context within which the patent systems of both Ghana and Nigeria were developed and are currently practised, especially as a conduit for transfering to and developing technology in the two countries. In addition, they have manifested some deficiencies in these countries' legal and institutional mechanisms for regulating the inflow of foreign technology. Accordingly, we shall in this section, based on our findings, offer some suggestions, which must be considered as a supplement to those already discussed in the course of the examination of some of the provisions under the patent and technology transfer laws of both countries in the preceding chapters, in the hope of improving both the patent systems and the technology regulatory regimes of the two countries and making them more effective in spurring on the transfer and development of technology in these countries.

The Patent System

As already noted, the patent systems of both Ghana and Nigeria were developed not within the context of any national technology

programme. It is important, however, that for the former to play any meaningful role in the two countries' technological development efforts they will have to be incorporated into their national technology programmes.

For any such incorporation there must exist, first and foremost, a well balanced and coherent national technology policy which must necessarily encompass the patent system. Such a technology policy must deal with how the pattern of techniques currently in use as well as new ones both developed domestically and imported from abroad can be improved upon and used to serve the dual objective of increasing labour productivity and meeting the basic human needs of their nationals. Moreover, it must define the role and place of all the agents of technology transfer such as the patent system, FDI, joint-ventures, technical and management services and the import of capital goods. Furthermore, it must cover the development of indigenous manpower skills, the upgrading of and increase in R & D personnel and resources respectively, and, generally the creation of the right environment for indigenous R & D. Technology, as has earlier been indicated, involves not only physical but also social technology, especially the framework of social relations and organisations through which the strategy of technology transfer and development has to be undertaken. Consequently, the national technology policy will necessarily have to take into account the social relations of production.

It may be added that the technology policy to be adopted must not be isolated from but rather dovetailed into the entire national economic plan. This is crucial because it is only when it is made a necessary link in the overall national economic development programme

that its effective implementation may be guaranteed since either the non-feasance or malfeasance of the technological component may adversely affect the whole economic programme if not brought into disarray. It is when the national economic development programme encompasses the national technology plan and the latter in turn covers the patent system that patents can be expected to play a more meaningful role in and make a harmonious contribution to the process of national technological and economic development.

It is against this background that any serious revision of the patent laws and systems of both Ghana and Nigeria will have to be undertaken. It is pertinent to note, however, that the mere incorporation of their patent systems into their national technology policies may not automatically bring about the desired results. Much will depend on the entire national economic and technology planning and more importantly the nature and quality of the patent system they adopt. The patent system to be developed must, therefore, be governed by the criteria of public interest, particularly that of national economic and technological development, instead of the lop-sided system as we presently have in the two countries which mainly favours inventors the majority of whom are foreigners. However, this public interest must be juxtaposed with that of the inventor.

In addition, for the patent system to be of any use it must reflect and be relevant to the economic situation and environment of the two countries. In particular, it must reflect their level of technological and economic development. In this respect, it may be suggested for both Ghana and Nigeria, which are not technologically sophisticated, the possible provision in their patent laws for other legal protection for inventors, mainly the domestic ones, through the

grant of rights such as utility model or petty patent, for smaller inventions and innovations with a lower novelty requirement. The benefit of such a provision is that protection will be offered to the countries' lone inventors at a much lower financial and bureaucratic costs, in exchange for a shorter period of protection.

It may, in the same respect, be suggested for both Ghana and Nigeria the possible inclusion of inventor's certificate in their range of legal rights for inventors. This may be very appropriate for these countries, not for the same rationale for its adoption by some Eastern European countries, but, in view of the inadequate financial capabilities of inventors in the former which does not make it possible for them to develop and exploit their inventions. So that by the adoption of inventor's certificate the legal rights to the relevant inventions will pass to the state which comparatively has more financial resources to undertake their exploitation while the inventors for their part will receive renumeration for their inventions.

Finally, the patent system must not only encourage domestic inventive activity but must also ensure the inflow of more generative technology than consumptive, and contribute to the development of I.T.C. Consequently, these objectives will have to permeate into the individual provisions of the patent legal regime, particularly in respects of issues such as the patentability of inventions, the terms and duration of patent grants as well as patent fees. It must be possible as suggested and discussed in detail in Chapters 5 and 7, particularly in Chapter 5, to use the provisions on these subjects and the entire patent system as a tool of economic policy for national economic development, especially to guarantee the transfer of generative technology and to facilitate the development of I.T.C.

It may be advisable, against this background for both Ghana and Nigeria to revise their patent legislation and system in order to make them more relevant and beneficial to their respective economics. In the case of Ghana it may be suggested that it should abrogate its present patent law and system because of their inherent deficiencies and replace them with new and autonomous patent law and system. This means that it will have to intensify the current efforts being made to develop independent patent legislation. The present patent system of Ghana, as already observed, not only involves a very expensive and cumbersome procedure for domestic inventors to obtain a Ghanaian patent, but also does not encourage the effective transfer of technology to the country, and makes no provisions to check abuses of patent monopoly priviledges (supra). As a result of all this and the fact that the criteria for patentability of inventions to be favoured with Ghanaian patents are based on the British requirements of patentability the present system if left unaltered may continue not only to hamper the effective transfer of technology to the country but also to impede the development of I.T.C. and the execution of a national technology programme as suggested.

For Nigeria whose patent law is based on the BIRPI Model Law which itself has since been revised it may not only need to amend its law so as to update it in terms of recent developments in the field, but to appraise its efficacy in the transfer of technology and the development of I.T.C. It may also need to examine how the provisions of its present patent law and system can be altered so as to fit in harmoniously with the current efforts being made to develop a technology policy for the country. In this respect, therefore, Nigeria as well as Ghana may need to take account of our preceding discussions including those centring on some of the crucial provisions under patent laws.

The final suggestion that needs to be made here relates to patent administrations in the two countries. It will be recalled that our discussions on the patent offices of both Ghana and Nigeria reveal that they have not been successful in the administration of patents and have in particular not been effective as data banks for new technical knowledge and as agents for the disclosure or spread of such knowledge. All this, as our discussions similarly reveal, have to a greater extent been attributed to the indifference of their governments to these offices' activities as well as inadequate resources as demonstrated by the case of the damaged Nigerian trademark and patent stamp (supra).

Consequently, it will be recommended that for these offices to contribute to the transfer and development of technology in both countries they will have to be properly staffed, given the necessary and adequate resources and furnished with the appropriate facilities. Moreover, there may be the need for their precise scope of operations to be properly defined and brought into the mainstream of technology planning and development. This will be one way of integrating the patent system with all other instrumentalities of development. In this way, the patent system will be able to assist in encouraging national inventiveness and, in general, strengthen the technological and scientific infrastructures of both countries. In effect, the patent administrations of the two countries must, instead of being isolated, be brought closer to and made to co-operate with other institutions directly involved in formulating and executing national development objectives.

Transfer of Technology Regulatory Regimes

As has already been hinted, our discussions in the previous chapters revealed some weaknesses with regard to the technology

transfer laws and regulatory systems of both Ghana and Nigeria, and it is these which we intend to address in this section. Before making any recommendations which may be applicable to both countries we shall first of all direct our attention to specific weaknesses pertaining to them individually.

It will be recalled that Ghana, unlike Nigeria, has not up to date adopted any regulations or criteria to guide the GIC in its evaluation and approval of technology transfer agreements. This means that the latter has no legally binding rules upon which it could either approve or refuse such agreements. The absence of these rules, as already indicated, has contributed to hampering the work of the GIC. It may also result in inconsistencies in the approval and regulation of technology transfer transactions in the country. It is, therefore, imperative that the Board of the GIC adopts, without any further delay, relevant regulations to govern technology transfer agreements as called for by S.30 of PNDCL 116.

We also noticed earlier on that in Ghana there are a number of bodies which vie with each other with respect to the regulation of technology transfer transactions. As has been observed, this creates unnecessary competition among these institutions and more importantly results in unwarrantable duplication of both manpower and financial resources which are not in adequate supplies in the country. Consequently, it may be recommended that the functions of regulating the transfer and development of technology may be entrusted to one central organisation, though the performance thereof may not necessarily be carried out under one roof. This will avoid the unwarranted rivalry between state institutions and duplication of scarce national resources, ensure an effective technology transfer regulation, as well as consistency and optimality in technology policies and plans.

In the case of Nigeria it was revealed that the NOIP which is the body entrusted with the regulation of the transfer of technology, unlike the GIC in Ghana, is not effectively linked to the bodies concerned with foreign investments and also plays very little role in the technological evaluation of foreign investment proposals. In view of the fact that technology transfer is an integral aspect of foreign investment and the regulation of the two may therefore be integrated it necessarily becomes important that the technological relations between the NOIP and other bodies concerned with foreign investments are re-examined with a view to bringing them much closer together if not integrated.

The first general recommendation which applies to both countries relates to the exclusion of machinery, equipment and capital goods imports from technology transfer transactions which must be examined by the competent regulatory bodies. It will be recalled that S.40 of PNDCL 116 does not include in the definition of technology transfer agreement any agreement which concerns the import of machinery and equipment. In the case of Nigeria though S.4(d)(v) includes agreements for the supply of machinery and plant in the definition of registerable transfer of foreign technology agreements involving Nigerian parties a NOIP guideline excludes from its registration exercise all technology transfer agreements involving the import of machinery and equipment unless foreign personnel are used in the execution (supra). The exclusion of this type of transaction from examination by the competent bodies seems to be very inappropriate. The supply or importation of capital equipment, as already remarked is not only another important vehicle for transferring technology but also one which is equally fraught with restrictive practices and it

will, therefore, have been expected to have had it included in the technology transfer transactions which are supposed to be examined or screened by the technology regulatory authorities. Accordingly, we recommend that the imports or supplies of foreign machinery and capital equipment be included in the transactions to be examined and registered by both the GIC and NOIP.

A crucial aspect of the entire technology transfer regulatory regime which previous discussions have abundantly revealed to be absent and thus an outstanding issue in both Ghana and Nigeria is an efficacious monitoring system. It is important, as already indicated, that an effective and comprehensive monitoring system be perceived as a fundamental aspect of the regulation of the transfer of technology and developed in both countries. When this is done it will enable the competent bodies to undertake the actual follow-up of approved contracts and to ascertain the absorption and adaptation of technologies covered by such contracts, especially at the time of renewals. It may be added that the monitoring system to be developed must also examine not only the behaviour of technology suppliers and their restrictive practices but, as one UNCTAD report (1980b) suggests, the behaviour of technology recipients as well. It is only through this that it will be possible to discover the extent to which government regulations have been circumvented or not as well as the impact of the legal policies pursued in this field.

Moreover, it does appear that so far the competent bodies in both countries, especially in the case of Nigeria since Ghana has not been very active in the regulation of technology transfer, have been preoccupied with the examination, approval and registration of technology transfer agreements without being actively involved in the

actual selection of the technologies imported into the respective countries through these agreements. It may, therefore, be suggested that instead of this passive role the competent bodies must play a more active part in the process of selecting foreign technologies. This will permit a closer integration of the regulatory units into the indigenous system of technological development.

Finally, since the transfer of technology between parent multinational companies and their subsidiaries in both countries still takes place on a considerable scale it may be necessary for the competent authorities in both countries to develop and extend their regulatory activities beyond technology transactions between foreign technology suppliers and domestic enterprises, as it is currently the case, to encompass those between parent and subsidiary companies. Such a move will not only bring the technology transactions between the latter under the scrutiny of the competent bodies but will also enable them to keep, to some extent, a check over the indirect means of profit repatriation from subsidiaries to their parent companies or other affiliates, especially transfer pricing. It is when all these are done that the competent bodies will be in a better position to ascertain the efficacy of government regulations on the transfer of technology.

Conclusion

We have, in this chapter, endeavoured to highlight some of the main similarities and dissimilarities between the patent and technology transfer laws as well as the patent administrations and technology regulatory regimes of Ghana and Nigeria. In addition, we have also, based on our findings, put forward some suggestions in the hope that they may be able to rectify some of the inadequacies of the said laws and regimes of both countries.

CONCLUSION

In the opening chapter of this study we have discussed the concept of technology and explained it in terms of the knowledge to use and make tools to satisfy human needs. This, it will be recalled, was intimately related to the social relations of production. In the same chapter the legal nature of a patent and the economic functions of the patent system, which include the spread and disclosure of technical knowledge, R & D, innovation, and the transfer of technology, were also discussed. Moreover, the chapter also examined some of the restrictive covenants which feature in technology licensing transactions, and demonstrated how they impede effective technology transfer. Finally, the chapter examined the process of the transfer of technology from the developed to the less developed countries. This was closely related to the problem of under development and the desire of the LDCs to eradicate poverty and thus satisfy their needs on a continuing basis. Consequently, we have explained the transfer of technology to mean the introduction of technology from one environment to another where its use will, in addition to meeting the needs of the recipient, be able to impart the necessary knowledge and skills for the satisfaction of these needs on a continuing basis. Based on the above we have classified the technology transfer process into generative and consumptive (supra) and have suggested the adoption of the former by LDCs which desire a permanent technological base for economic development.

The technology transfer process, as has already been observed, is effected through a number of conduits which include FDIs, joint-ventures, technical services and management contracts and the patent system. The last mechanism has been the focus of this thesis.

In this study, we have examined how the patent system actually contributes to the transfer of technology, and in the process noted some of the constraints that hamper the system in that respect.

In Chapter Two, for example, our discussion of the Paris Convention, which applies to both Ghana and Nigeria because of their accession to it, revealed that a number of its provisions do not work in their favour as well as other LDCs. These provisions include articles 2, 4, 5 (A)(1) and 5 quater which deal with national treatment, priority rights, imports generally, and importation of products derived from patented products respectively.

In addition to the Paris Convention, we have, in the course of our discussion of the patent laws and systems of both Ghana and Nigeria in Chapters Four and Five, and Chapters Six and Seven respectively, revealed a number of inadequacies in the patent laws and systems of the two countries. As we endeavoured to demonstrate, they affect adversely the transfer of technology to both countries as well as the development of their I.T.C., and particularly in the case of Ghana the stimulation of domestic inventive activity and initiative.

It will be recalled that Ghana still operates a patent system which is founded on a 1925 colonial ordinance. This system, as has been explained, does not only incorporate the Ghanaian patent system into the U.K.'s, but also makes it difficult and costly for Ghanaian inventors to procure Ghanaian patents. In fact , the present law and system do not seem to be in harmony with the economic and technological needs and developmental efforts of the country. Clearly, in addition to the constraints imposed on Ghana by the Paris Convention, its own patent regime serves as a clog to its patent system as a tool for the transfer and development of technology.

On the other hand, Nigeria, unlike Ghana, has promulgated its own patent law modelled on the BIRPI Model Law and developed its own patent system. Nevertheless, besides some of the meritorious provisions already discussed, the Nigerian patent law, as revealed in Chapters Six and Seven, contains a number of provisions such as those relating to monopoly rights to processes, import monopoly rights, the system of examination, nullity of patents and contractual licenses which may not operate to its advantage.

It is, therefore, necessary for the two countries to assess the efficacy of their patent laws and systems with a view to making them more relevant to their technological and economic needs, and to ensure that they minimise the adverse effects of the Paris Conventions on their patent systems and economy. In this respect Ghana and Nigeria may stand to gain from other efforts and policies regarding patents at the international, national and regional levels. In particular, the two countries may need to learn from the experiences of the Latin American countries.

It will be recalled in Chapter Two that some Latin America countries including Brazil, the Andean Pact countries and Mexico, as well as India have taken steps to streamline their patent regimes in order to make them more relevant to their respective economies. They have, in particular, reformed their patent laws, with the objective, inter alia, of redefining the concept of invention, on the basis of a subjective concept requiring inventive activity as an important element of the invention. Moreover, these reforms have clarified and strengthened the conditions for the working of patents eliminated monopoly of imports granted to the patentee, and suppressed patentability in certain economic sectors. All this is

aimed at making the patent system a relevant tool for the economic development of the countries involved.

Ghana and Nigeria may need, instead of continuing their present patent system, to follow the example of these countries if they are to derive any economic benefit from their respective patent systems. In addition to the subjective redefinition of the concept of invention, the clarification and strengthening of the conditions for the working of patents, exclusion of import monopoly grants and the suppression of patentability, the two countries will need to tailor the individual relevant patent provisions such as patentability, patent duration, fees and monopoly grants to their respective needs and employ them as measures for technological development. As already indicated, all this could be more effective only within the framework of a national technological programme and policy.

It may be reiterated that, for a meaningful contribution to the technology development process, the patent administrations in the two countries must be developed and encouraged to serve as effective data banks for technical information and as instruments for disclosing and spreading technical knowledge to institutions, bodies or individuals who may require them. The patent administrations must also be involved with the relevant institutions in the formulation and implementation of national development plans. In this way, the patent system could be integrated with all other instruments of development and thus contribute to the strengthening of the technological and scientific infrastructure of the two countries. All this will not only enable their patent systems to make available new technological information but also to make the best use of their limited skilled manpower resources available for development in both countries.

It is necessary, therefore, for Ghana and Nigeria to evaluate the effectiveness of their patent laws in contributing to meeting their technological needs and the development of I.T.C., and to revise them against this background to include the suggestions put forward in the study, particularly in Chapter Eight. Ghana may not only need to revise its patent law, but possibly to jettison it completely in favour of a new one.

All this must be done in relation to the efficient development of the technology transfer regulatory regimes being pursued by both Ghana and Nigeria. This will ensure the effective transfer of technology to the two countries, as well as the exclusion of anticompetitive practices associated with this transaction, including patent licensing agreements which involve nationals of both countries. For the patent system, and especially licensing requirement to be very effective in this respect the present regulatory regimes must be strengthened, and a well developed monitoring system set up in the two countries to ensure compliance with relevant government regulations. In this regard, Ghana and Nigeria may benefit from the experiences of other LDCs including some Latin America countries, and particularly India which is the only LDC with a well developed monitoring system.

It is only when all this is done that the patent systems and the technology transfer regulatory regimes of the two countries can contribute to the effective transfer of technology to and development of I.T.C. in their respective countries. It is important to point out here that we are not under any illusion that the mere revision and promulgation of new patent laws, and the strengthening of the technology regulatory regimes will automatically lead to the accomplishment of the above objectives. However, the revision of these laws to reflect the levels of economic and technological

development allowing them to be employed as measures for economic development, as well as the consolidation of their technology regulatory regimes will mark the beginning of the use of the patent system and technology licensing requirement as tools for the transfer and development of technology in both countries.

It hardly need be added that for all these to be successful there will be the need for additional supporting measures to be evolved. In particular, there will be the need to develop the domestic technological infrastructure and to create the right economic environment for technology transfer and development activities. Moreover, the necessary political direction and support for these activities will be an additional prerequisite. It is against this background that the revision and strengthening of the patent systems and technology transfer regimes of Ghana and Nigeria, will enable them, instead of adopting the present passive role, to make a more meaningful contribution to the efficient and effective transfer of technology to and development of indigenous technological capabilities in both countries. It is hoped that this thesis is a contribution to that end.

INDUSTRIAL PROPERTY STATISTICS

GENERAL NOTES

Annex I

TECHNICAL UNITES TAKEN FROM THE INTERNATIONAL PATENT CLASSIFICATION (IPC)

Technical units	Section A - HUMAN NECESSITIES
1	Sub-Section: Agriculture Classes: A01 - Agriculture; Forestry; Animal Husbandry; Hunting; Trapping; Fishing Except: A01N - Preserved animals or plants or parts thereof; Chemical treatment, e.g. disinfection of soil or living plant material; Pesticides and herbicides
2	Sub-Section: Foodstuffs and Tobacco Classes: A21 - Baking, Edible Doughs A22 - Butchering; Meat Treatment; Processing poultry or fish A23 - Foods or Foodstuffs; their treatment not included in other classes A24 - Tobacco; Cigars; Cigarettes; Smokers' Requisites
3	Sub-Section: Personal and Domestic Articles Classes: A41 - Wearing apparel A42 - Headwear A43 - Footwear A44 - Haberdashery; Jewellery A45 - Hand and travelling articles A46 - Brushware A47 - Furniture; Domestic articles or appliances; Coffee mills; Spice mills; Suction cleaners in general

INDUSTRIAL PROPERTY STATISTICS

GENERAL NOTES

Annex I
page 2

4	Sub-Section: Health and Amusement Classes: A61 - Medical and veterinary science; Hygiene Except: A61K - Preparations for medical, dental or toilet purposes A62 - Life-saving; Fire-fighting A63 - Sports; Games; Amusements
5	A61K- Preparations for medical, dental or toilet purposes
6	Section B - PERFORMING OPERATIONS Sub-Section: Preparing and Mixing Classes: B01 - Physical and chemical processes or apparatus in general B02 - Crushing, pulverising or disintegrating; Preparatory treatment of grain for milling B03 - Separation of solid materials using liquids or using pneumatic tables or jigs; Magnetic or electrostatis separation B04 - Centrifugal apparatus or machines for carrying-out physical or chemical processes B05 - Spraying, atomising in general; Applying liquids or other fluent materials to surfaces, in general B06 - Generating or transmitting mechanical vibrations in general B07 - Separating solids from solids; Sorting B08 - Cleaning
7	Sub-Section: Shaping Classes: B21 - Mechanical metal-working without essentially removing material; Punching metal B22 - Casting; Powder metallurgy B23 - Machine tools; Metal-working not otherwise provided for

8	B24 - Grinding; Polishing B25 - Hand tools; Portable power-driven tools; Manipulators B26 - Hand cutting tools; Cutting machines or devices not specially adapted for particular materials or purposes B27 - Working, preserving wood or similar material; Nailing or stapling machines in general B28 - Working cement, clay, and stone B29 - Working of plastics; Working of substances in a plastic state, in general; Working of substances not otherwise provided for B30 - Presses Except: B31 - Making paper articles; Working paper B32 - Layered products
9	Sub-Section: Printing Classes: B41 - Printing; Lining machines; Typewriters; Stamps B42 - Bookbinding; Albums; Files; Special printed matter B43 - Writing and drawing appliances; Bureau accessories B44 - Decorative arts
10	Sub-Section: Transporting Classes: B60 - Vehicles in general B61 - Railways B62 - Land vehicles for travelling otherwise than on rails B63 - Ships or other waterborne vessels; Related equipment B64 - Aircraft; Aviation; Cosmonautics
11	B65 - Conveying; Packing; Storing; Handling thin or filamentary material B66 - Hoisting; Lifting; Hauling B67 - Liquid handling B68 - Saddlery; Upholstery

INDUSTRIAL PROPERTY STATISTICS

GENERAL NOTES

Annex I
page 4

	Section C - CHEMISTRY AND METALLURGY
12	Sub-Section: Chemistry Classes: C01 - Inorganic chemistry C02 - Treating water, waste water and sewage C03 - Glass; Mineral and slag wool C04 - Cements; Ceramics, etc.; Sound or thermal insulating materials C05 - Manufacture of fertilisers
13	C07 - Organic chemistry and A01N- Preserved animals or plants or parts thereof; Chemical treatment, e.g. disinfection of soil or living plant material; Pesticides or herbicides Except: C06 - Explosives and matches
14	C08 - Macromolecular compounds; Their preparation or chemical working-up; Compositions based thereon
15	C09 - Dyes; Paints; Polishes; Natural Resins; Adhesives; Miscellaneous Compositions; Miscellaneous Applications of Materials C10 - Petroleum, gas and coke industries; Technical gases containing carbon monoxide; Fuels; Lubricants; Peat C11 - Animal and vegetable oils, fats, fatty substances and waxes; Fatty acids therefrom; Detergents; Candles
16	C12 - Fermentation industry; Beer; Spirits; Wine; Vinegar; Yeast C13 - Sugar and starch industry C14 - Skins; Hides; Pelts; Leather

INDUSTRIAL PROPERTY STATISTICS

GENERAL NOTES

Annex I
page 5

17	Sub-Section: Metallurgy Classes: C21 - Metallurgy of iron C22 - Metallurgy; Ferrous or Non-Ferrous Alloys; Treatment of alloys or non-ferrous metals C23 - Working or treatment of metals, other than by mechanical means; Covering materials with metals; Inhibiting corrosion or incrustation in general C25 - Electrolytic or electrophoretic processes; Apparatus therefor
	Section D - TEXTILES AND PAPER
18	Sub-Section: Textiles and Flexible Materials not Otherwise Provided for Classes: D01 - Natural or artificial threads or fibres; Spinning D02 - Yarns; Mechanical finishing of yarns or ropes; Warping or beaming D03 - Weaving D04 - Braiding; Lace-making; Knitting; Trimmings; Non-woven fabrics D05 - Sewing; Embroidering; Tufting D06 - Treatment of textiles, etc.; Laundering; Flexible materials not otherwise provided for D07 - Ropes; Cables other than electric
19	Sub-Section: Paper Classes: D21 - Paper-making; Production of cellulose and B31 - Making paper articles; Working paper

INDUSTRIAL PROPERTY STATISTICS

GENERAL NOTES

Annex I
page 6

	Section E - FIXED CONTRUCTIONS
20	Sub-Section: Building Classes: E01 - Construction of roads, railways and bridges EC2 - Hydraulic engineering; Foundations; Soil-shifting E03 - Water supply; Sewerage E04 - Building E05 - Locks; Keys; Window and door fittings; Safes E06 - Doors, windows, shutters and roller blinds, in general; Ladders
21	Sub-Section: Mining Classes: E21 - Mining
	Section F - MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING
22	Sub-Section: Engines and Pumps Classes: F01 - Machines or engines in general; Engine plants in general; Steam engines F02 - Combustion engines; Hot-gas or combustion-product engine plants F03 - Machines or engines for liquids; Wind, spring, weight, and miscellaneous motors; Producing mechanical power or a reactive propulsive thrust, not otherwise provided for F04 - Positive-displacement machines for liquids; Pumps for liquids or elastic fluids Sub-Section: Engineering in General Classes: F15 - Fluid-pressure actuators; Hydraulics or pneumatics in general

INDUSTRIAL PROPERTY STATISTICS

GENERAL NOTES

Annex I
page 7

23	F16 - Engineering elements and units; General measures for producing and maintaining effective functioning of machines or installations. F17 - Storing or distributing gases or liquids
24	Sub-Section: Lighting and Heating Classes: F21 - Lighting F22 - Steam generation F23 - Combustion apparatus; Combustion processes F24 - Heating; Ranges; Ventilating F25 - Refrigeration or cooling; Manufacture or storage of ice; Liquefaction and solidification of gases F26 - Drying F27 - Furnaces; Kilns; Ovens; Retorts F28 - Heat exchange in general
25	Sub-Section: Weapons; Blasting Classes: F41 - Weapons F42 - Ammunition; Blasting and C06 - Explosives; Matches
26	Section G - PHYSICS Sub-Section: Instruments Classes: G01 - Measuring; Testing G02 - Optics G03 - Photography; Cinematography; Electrography; Holography
27	G04 - Horology G05 - Controlling; Regulating G06 - Computing; Calculating; Counting G07 - Checking devices G08 - Signalling

INDUSTRIAL PROPERTY STATISTICS

GENERAL NOTES

Annex I
page 8

28	G09 - Education; Cryptography; Advertising; Seals G10 - Musical instruments; Acoustics G11 - Information storage G12 - Instrument Details
29	Sub-Section: Nucleonics Classes: G21 - Nuclear physics; Nuclear engineering
30	Section H - ELECTRICITY
	Classes: H01 - Basic electric elements H02 - Generation, conversion or distribution of electric power Except: H03 - Basic electronic circuitry H04 - Electric communication technique H05 - Electric techniques not otherwise provided for
31	H03 - Basic electronic circuitry H04 - Electric communication technique
32	Others (unclassified; plant patents/inventors' certificates)

[End of Annex I]

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